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The *ROYAL CANADIAN AIR FORCE JOURNAL* is an official publication of the Commander Royal Canadian Air Force (RCAF) and is published quarterly. It is a forum for discussing concepts, issues and ideas that are both crucial and central to air and space power. The *Journal* is dedicated to disseminating the ideas and opinions of not only RCAF personnel, but also those civilians who have an interest in issues of air and space power. Articles may cover the scope of air-force doctrine, training, leadership, lessons learned and air-force operations: past, present or future. Submissions on related subjects such as ethics, technology and air-force history are also invited. This journal is therefore dedicated to the expression of mature professional thought on the art and science of air warfare and is central to the intellectual health of the RCAF. It serves as a vehicle for the continuing education and professional development of all ranks and personnel in the RCAF as well as members from other environments, employees of government agencies and academia concerned with air-force affairs.

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ROYAL CANADIAN AIR FORCE JOURNAL

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The *ROYAL CANADIAN AIR FORCE JOURNAL (RCAFJ)* welcomes the submission of articles, book reviews and shorter pieces (which will be published in the Letters to the Editor, Points of Interest, Pushing the Envelope and Point/Counterpoint sections) that cover the scope of air-force doctrine, training, leadership, lessons learned and air-force operations: past, present or future. Submissions on related subjects such as ethics, technology and air-force history are also invited.

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ITEM	WORD LIMIT*	DETAILS
LETTERS TO THE EDITOR	50–250	Commentary on any portion of a previous *RCAFJ*.
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For the Fall issue: **30 July**

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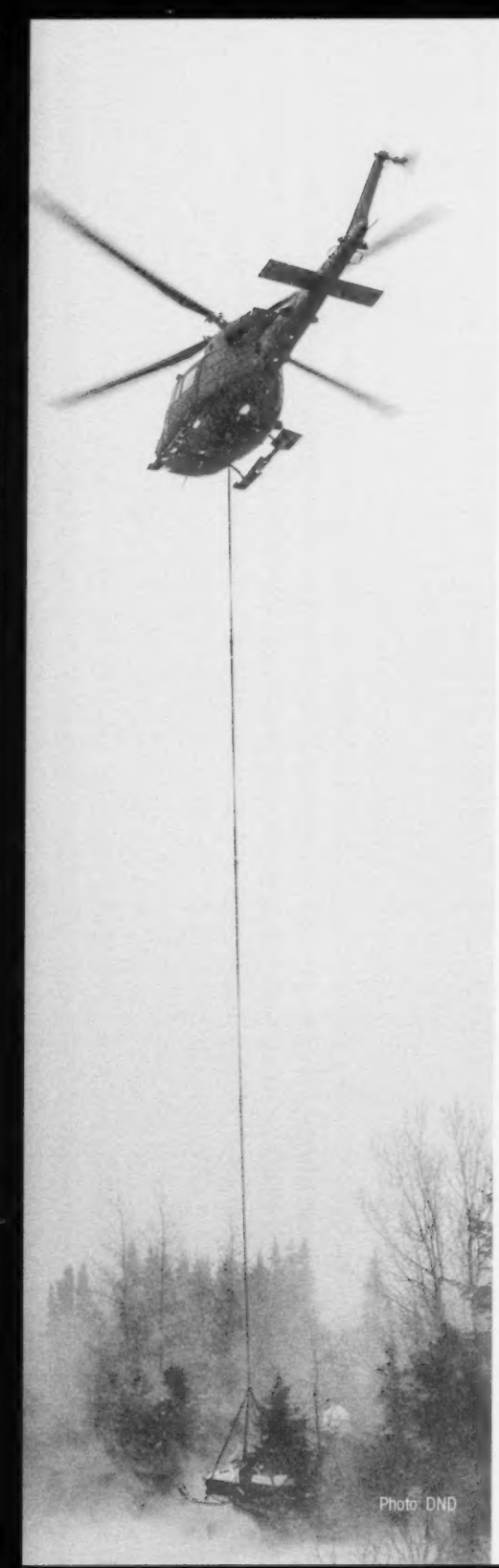

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EDITOR'S **MESSAGE**

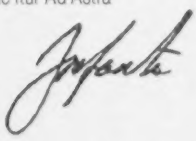
As we start a new year for the *Royal Canadian Air Force Journal* (*RCAFJ*), I would like to take the opportunity to thank all those who have previously provided outstanding content. As will become apparent, the theme of this issue is the diversity of contributors and topics. I believe that it is this diversity that makes the *RCAFJ* a unique venue to discuss air force issues from a variety of perspectives. Arguably, many of the ideas published will differ from those ideas we hold dear. Take the opportunity to understand where the author might be coming from and compare and contrast their opinion with your perspective. At that point, drop a note to the editor with your thoughts, and we will be happy to include it in an upcoming issue. Alternatively, readers with access to the Defence Wide Area Network (DWAN) can comment on any issue of the *RCAFJ* at http://w08-ttn-vmweb01/CFAWC/en/elibrary/journal/current-issue.asp.

Over the years we have heard from a broad range of authors. This included the United States Air Force's Brigadier General Boera's "Building Air Power for Afghanistan: A Team Effort" and the Royal Canadian Air Force's (RCAF's) Corporal Templeman's "Afghanistan Contingency Operations: The Role of the CC177 Globemaster Aircraft Maintainer." Wing Commander Glasson provided us a Royal Australian Air Force perspective on air power in small wars in "'Big War' Air Power for 'Small War' Operations," while Dr. Gongora provided his thoughts on "The Relevance of Manned, Fixed-Wing Aircraft in the Provision of ISR and C2 Support."

In this issue, we start with an article from Chief Warrant Officer Nicole Belanger, "Being a Member of the Profession of Arms: An RCAF Chief Warrant Officer's Perspective." The article explores the profession of arms from the non-commissioned members' perspective and provides some interesting insights into the profession of arms. The second article, "Flying in the Peripherals: The Use of Aircraft in Small Wars," is written by Officer Cadet Mitchell Hewson, a fourth-year cadet at the Royal Military College of Canada. Hewson explores the use of air power in small wars from a historical perspective and comments on the implications to today's operations. The third article, "The Fusion of Doctrines: A Discussion on Sustainment Operations During Operation IMPACT," by Lieutenant-Colonel Luc Girouard, examines the challenges involved in applying Canadian support doctrine to a joint operation that involves a unique combination of troops in theatre at a variety of locations and describes the engagement required to rationalize the varied approaches to support. Finally, wrapping up this issue's articles is Dr. Allan English, who currently teaches Canadian military history in the Queen's University History Department. "Rethinking RCAF Senior Officer Professional Military Education in the 21st Century: Learning from the Past" takes a look at the history of professional education within the RCAF and provides insights into dealing with the delivery of professional education to the RCAF's senior officers. All in all, this is a diverse group of authors who touch on a variety of relevant RCAF topics.

Enjoy the read.

Sic Itur Ad Astra



Lieutenant-Colonel Doug Moulton, CD, MBA
Senior Editor

LETTER TO THE EDITOR

Dear Sir,

Congratulations to the editorial staff of the *Royal Canadian Air Force Journal* for the two outstanding issues that were Volume 5, issues 3 and 4.[1]

The author of "Can Unmanned Aircraft Systems Meet Canadian Air Power Needs?" has put forward a strong argument in the Summer 2016 issue for "not radically altering the Royal Canadian Air Force's (RCAF's) force structure in the near future."[2] The 2017 budget has now spoken to that! What radical change is possible in the short term with little or no new monies "immediately" available?

It is unfortunate that the author chose the Royal Australian Air Force rather than the Israeli Defence Force (IDF) as the "look to" model. The IDF has longer experience with unmanned aircraft systems (UASs) in tactical combat roles and faces the same issues confronting the Canadian Armed Forces (CAF)—manpower and money limitations—although for different reasons. I am sure that the IDF does not train their UAS operators to manned-aircraft-pilot standards. For the Canadian situation, this is a red herring, as by the time Canada starts seriously looking at UASs for the RCAF there will probably be no need for pilots. Such UASs will be autonomous. Processing the information will be the requirement; strong technological support for quick analysis will be the main requirement. Tesla is almost with us now. Autonomous unmanned underwater vehicles are being tested as this is written. To factor in the cost of training UAS "pilots" to manned-aircraft-pilot standards in making decisions on UASs is not valid, in my opinion.

There is no doubt that CAF "should foster capability, operational knowledge and technical familiarity"[3] as suggested by the author. His article and its appearance in this journal contribute to that happening! I would go further in this time of restraint (no new monies in 2017) and suggest that the RCAF create a drone training programme for air cadets to follow. In addition, air cadet squadrons might be encouraged to not only train drone operators but also organize themselves so that these assets are available to local first responders undertaking search and rescue (SAR). As reported in the Ottawa Citizen last year, Renfrew paramedics used unmanned aerial vehicles in SAR operations.[4] What better way to introduce practice with the operation of RCAF drones at little cost (such as no pilot pay for operators) than in consort (if required) with manned SAR aircraft (particularly the newly acquired) and paramedics?

Hopefully, funding will soon start flowing for the existing RCAF plans! Otherwise discussion will soon centre on the questions of which autonomous airframe(s) should be bought and, perhaps, revolutionary force-structure changes.

Thanks again for two great issues.
Major F. Roy Thomas (Retired), MSC, CD, MA

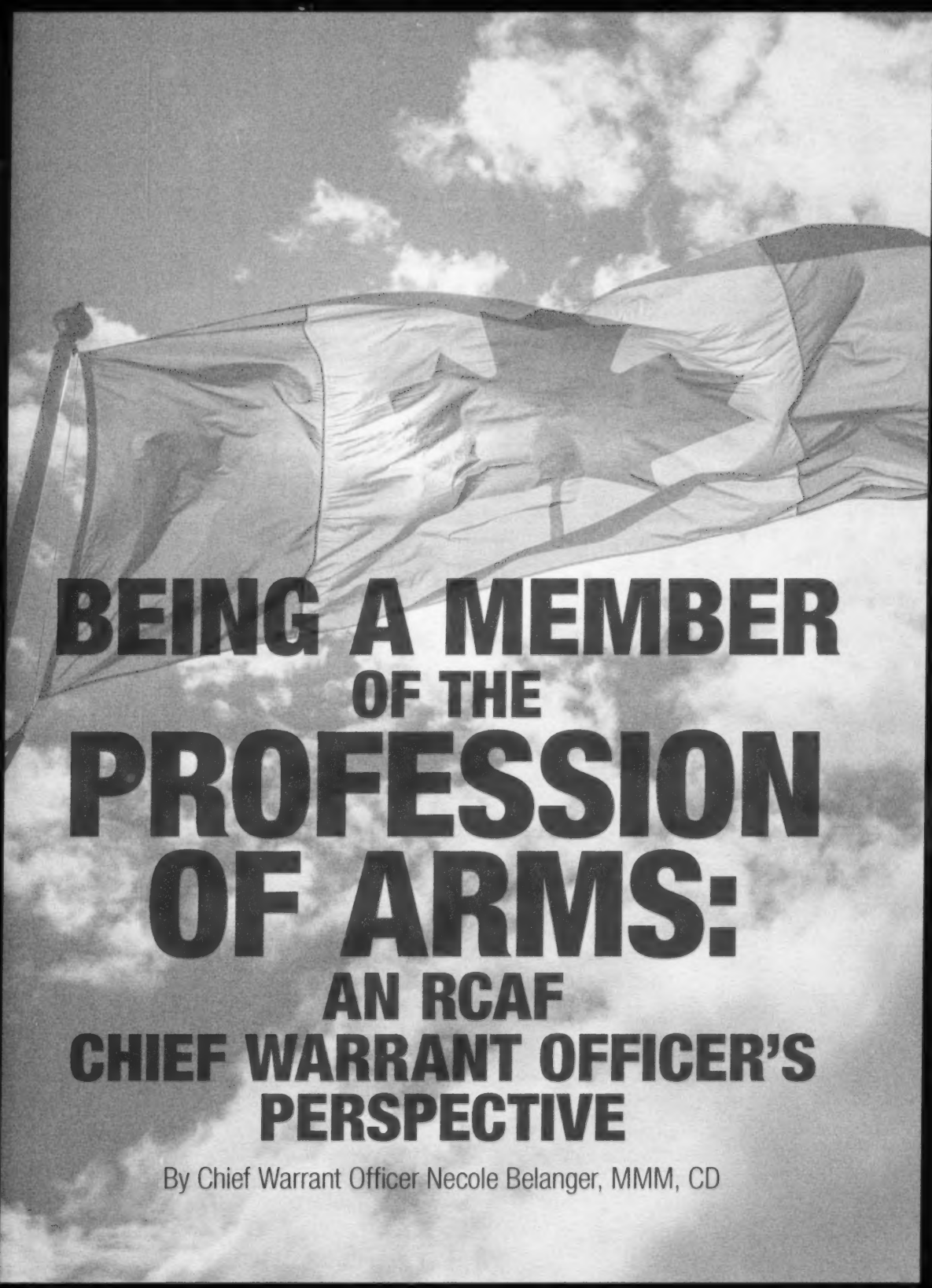
NOTES

1. Available at The Royal Canadian Air Force Journal Archives, Royal Canadian Air Force, accessed November 9, 2017, http://www.rcaf-arc.forces.gc.ca/en/cf-aerospace-warfare-centre/elibrary/journal/archives.page.

2. Conrad Edward Orr, "Can Unmanned Aircraft Systems Meet Canadian Air Power Needs?," *Royal Canadian Air Force* Journal 5, no. 3 (Summer 2016): 15.

3. Orr, "Can Unmanned Aircraft Systems," 15.

4 . Joanne Laucius, "Sky's the Limit: Renfrew Paramedics Harness the Power of Drones," *Ottawa Citizen*, April 19, 2016, accessed November 9, 2017, http://ottawacitizen.com/news/local-news/skys-the-limit-renfrew-paramedics-harness-the-power-of-drones.



BEING A MEMBER OF THE PROFESSION OF ARMS: AN RCAF CHIEF WARRANT OFFICER'S PERSPECTIVE

By Chief Warrant Officer Necole Belanger, MMM, CD

If you subscribe to the Cold War writings of Samuel Huntington concerning who is and who is not a professional within the profession of arms, then this article is not for you. If, however, you are a believer that non-commissioned members (NCMs) are professionals, then read on.

In his cutting-edge book, *The Soldier and the State*, Huntington hypothesizes that only officers can be considered professional soldiers. According to Huntington, officers are concerned with the management of violence, while the NCMs' focus is on the application of violence. From this, he concludes that the expertise and responsibility required to manage violence make it a profession, whereas applying violence necessitates much less training and education, hence making it a mere trade.[1] Huntington's suppositions came during an era when Cold War tactics prevailed and there was no requirement for NCMs to do more than apply the violence dictated by those managing it within our hierarchical top-down environment. However, in today's complex, uncertain, and volatile operational environment, NCMs require skills and understanding that extend far beyond the mere application of violence.

Before moving forward and getting to the overall objective of this article, which is for NCMs to refine their understanding of what it means to commit to the responsibilities and behaviours as articulated in *Duty with Honour: The Profession of Arms in Canada*, it is imperative that we examine the terms profession, professional, professionalism, and professionalization as they relate to the NCM corps. A profession, according to noted sociologist Andrew Abbott, does not have a fixed definition. Speaking loosely, Abbott states that a profession consists of "somewhat exclusive groups of individuals applying somewhat abstract knowledge to a particular area."[2] In the case of the profession of arms, that particular service is the "ordered, lawful application of military force pursuant to governmental direction."[3] Members of this profession are trained to use lethal force in fulfilling their duties, and a member of this profession must also be prepared to die in defence of their duties (unlimited liability). It is this acceptance and belief in unlimited liability that distinguishes and sets the profession of arms apart from any other profession.

A professional is any member of that profession who possesses the specialized knowledge and skill required by that profession. "In the Canadian military context, the minute you swear the oath of allegiance you become a member of the profession of arms and [Canadian Armed Forces (CAF)] doctrine states that the first time you put on a Canadian Armed Forces uniform, you become a professional as this status is based upon the responsibilities inherent to the use and management of violence."[4] Along with putting on the uniform, there are very high expectations for both behaviour and practice; hence, while the very word professional implies you are an expert, skills and formal learning will determine your level of professionalism, as will the way you work and act.

Professionalism comprises the personally held beliefs about one's own conduct within the profession and it (professionalism) must be taught.[5] It cannot be assumed that sailors, soldiers, airmen, and airwomen understand what it means to be a professional; thus, *Duty with Honour* defines professionalism as comprising four attributes: responsibility, expertise, identity, and professional ideology.[6] These four attributes will be individually examined throughout this article.

Finally, professionalization is the pattern of how a profession develops.[7] The professional development (PD) of the NCM corps has been the focus of considerable attention since the issuance of *Non-Commissioned Member Corps 2020* and the inclusion of NCMs as professionals within the profession of arms. Initiatives such as PD programmes—like the Intermediate Leadership Programme (ILP), the Advanced Leadership Programme (ALP), the Senior Leadership Programme (SLP), and the Senior Appointments Programme (SAP)—along with the influx of education-centric

content on these courses at the Chief Warrant Officer Osside Profession of Arms Institute, play "a key role in enabling [the NCM corps] to develop the intellectual and leadership skills they will need to meet the requirements of command in an increasingly complex and changing world."[8]

Naturally, one cannot simply decree themselves to have professional status because it is not an inherent right; professional status must be granted by the public. "The public will enter into the necessary social contract only if the service offered is of vital importance."[9] More on the social contract and what happens when a party breaches the contract later in the article. Certain characteristics or criteria, which are typically measured against the traditional professions like medicine and the law, are required in order to judge whether a particular occupation qualifies as a profession. Most notably, these criteria include "a skill based on theoretical knowledge obtained through extended and standardized education, demonstrated competence, a high level of organization, codification of behaviour and altruism,"[10] or self-sacrifice. Therefore, as you will see, based on this yardstick, the NCM corps possesses all the defining elements of a profession, thus making NCMs professionals within the profession of arms.

CWO Necole Belanger is currently the 16 Wing CWO.

In *Duty with Honour*, as previously mentioned, military professionalism is characterized by four main attributes: **responsibility**, which is our duty to society (social contract / codification of behaviour); **identity**, which reflects our unique standing within society as sailors, soldiers, airmen, and airwomen (high level of organization); **expertise**, which is the abstract body of knowledge that sailors, soldiers, airmen, and airwomen possess (demonstrated competence); and **professional ideology**, the values and obligations underpinning the profession of arms (altruism or self-sacrifice). These four attributes cement the profession of arms as a profession. Further, the attributes are incorporated into the broader construct of the uniquely **Canadian Military Ethos**[11] which is founded on the principle of mission before self. And, nothing reinforces this principle more than "unlimited liability."[12]

I want to stay on the concept of unlimited liability because it is more than just being willing to accept an operational assignment or posting. Unlimited liability equates to the precept of putting the mission before anything else, including ourselves. This is described to us using the philosophy of "mission, man, self." This credo easily rolls off the tongue, but simply learning this idiom by rote does not make it a core belief, nor does it prove an adequate depth of understanding. For a more in-depth understanding, one should study the CAF effectiveness framework.[13]

When I joined CAF, I was instructed to read and sign dozens of forms before I swore my oath of allegiance and headed off to Cornwallis, Nova Scotia, for my recruit training. One of the papers I was required to sign referred to this abstract construct called "military ethos." I suspect,

like most young people from my generation, I just signed it and never gave this thing a second thought. That is, not until much later in my career. Because I did not understand its function within the profession of arms, I did not always subscribe to these attributes. I did not always act in a professional manner, nor was I held to that, and I defaulted to protecting my buddies and myself.

It was not until I started truly practising direct leadership that my point of view began to change and I unconsciously ingested the true meaning (for me) of military ethos. Leading people at the master corporal through to master warrant officer ranks involved more face-to-face leadership and was military-task centred. As I moved through the leadership levels, I quickly learned that leading the institution was more about my span of influence—influencing people using the personal power that I had amassed over my career to change day-to-day activities. Through trial and error, I discovered that leading people and leading the institution do not involve two completely opposing philosophies; rather they are "two, always present aspects, of a leadership approach."[14] For example, Robert Walker explains that whether leading people or leading the institution, "the purpose and the general objectives are the same up and down the continuum, however the process evolves and the specifics of the requisite attributes change."[15] This new perspective on leadership allowed me to have that epiphany of awareness that changed the way I saw things and allowed me to return to the *Duty with Honour* publication and really examine the taxonomy of attributes of military professionalism and my role as a CAF leader.

Responsibility is defined as our duty to society—the defence of Canada and Canadian interests—meaning that civilian control makes security subordinate to the larger purpose of our nation, rather than the other way around.[16] Our purpose is to defend society, not define it. But what exactly does that mean? When the state gives us the right to use deadly force as prescribed, this right must be exercised with discipline and integrity. Former Deputy Chief of the Defence Staff, Lieutenant-General R. Crabbe (Retired), stated that "discipline serves three purposes; control force so it is not abused, ensures mission accomplishment despite dangers and assists in assimilating a new recruit to the institutional values of the military."[17] Discipline is easy, but self-discipline is fundamentally harder than following a set of orders because self-discipline entails the ability to pursue what one thinks is right despite temptations to abandon it. Like ethics, self-discipline is based on the member's internal regulation capacity rather than external regulation such as the code of service discipline and the military justice system. If this sounds familiar it should, because I am talking about integrity—one of the core values of a CAF member. As stated by United States Army Lieutenant Colonels Zeb Bradford and Frederic Brown:

> The professional [soldier] must be an unconditioned servant to state policy; he must have a deep normative sense of duty to do this … . One cannot do his duty unless he has courage, selflessness, and integrity. The military profession must have these group values as a functional necessity.[18]

What I have learned over the years is that as professionals we must not only comprehend our responsibilities to society and to our subordinates, but also commit and practice CAF values of duty, loyalty, integrity, and courage.[19] If we fail to act with integrity, the highest standard of ethical behaviour, then we lack professionalism and cannot claim ourselves to be professionals.[20] Scandals from the 1990s—the final straw being the torture and murder of a Somali teenager—led to a widespread loss of trust by both the Government of Canada and its citizens, who felt that its soldiers no longer represented Canadian values. This loss of trust or violation of the terms of the social contract (expectation that military would not abuse the power entrusted to them in their own interests) resulted in the military losing the right "to investigate itself, and thereby stripped a key attribute of any profession, self-regulation, from DND [Department of National Defence] and

the [CAF]."[21] The questions we need to pose to ourselves before moving forward are: today, are we carrying out our responsibilities as defined? And is integrity a problem among CAF members?

As the former chief warrant officer (CWO) for the Canadian Armed Forces Strategic Response Team on Sexual Misconduct, I propose that integrity is a problem among some CAF members. Today's military culture has shown that there appear to be significant differences between the military ethos—as epitomized by *Duty with Honour*—and the existing standards being practiced.[22] As stated earlier, a lack of integrity parallels a lack of professionalism, and this can have both an internal and an external impact. Internally, if we lose the trust of our own members, it triggers a cascade of effects. As illustrated in the *External Review into Sexual Misconduct and Sexual Harassment in the Canadian Armed Forces* by former Supreme Court justice Marie Deschamps, if we as leaders are quick to turn a blind eye to inappropriate behaviours, our subordinates follow suit and victims lose faith that anything will be done. Externally, the loss of trust can be potentially devastating because it reflects what society thinks of us as an institution.[23] There can be little argument that behavioural integrity is important. This notion should be common sense. But, "if it's so straightforward, why is it so rarely observed?"[24] It takes courage to profess your ethical standards and then act accordingly. And although it should not have to be said, I will say it anyway: courage is not just demonstrated on the battlefield! A leader who can consistently do the right things, when they need to be done, regardless of the potential loss of status or however great the personal cost, is a leader with courage and integrity. Courage and integrity are not things you pull out of a drawer, dust off, and exercise when it suits you; they must be practised daily.

The next attribute I would like to examine is identity, which can be directly correlated to our shared value of loyalty. Identity reflects our unique standing within society as sailors, soldiers, airmen, and airwomen. A professional within the profession of arms, first and foremost, will see themselves as a member of society, but while serving, they will never be a civilian.[25] Assuming that society holds a military member to a higher standard than a civilian, we must remember that we are "not separate from and superior to society."[26] "These distinct identities coalesce, however, around the concept of loyalty to the rule of law and the government. In fact, this overriding loyalty is at the apex of a hierarchy of loyalties that operates, in descending order, from the law and government to the [CAF] and thereafter through individual environments to unit and branch."[27] One of the comments in the guiding principles of former Chief of the Defence Staff General Rick Hillier was:

> Be proud, to be a sailor, soldier, airman or airwoman, but not so proud as to be stupid, not so blindly loyal to your environment or unit that you cannot effectively make decisions for the betterment of all, but loyal so you can work within one hyper-efficient team that can accomplish much more for Canada."[28]

Our collective identity or sense of belonging is about the one thing that all CAF members have in common, the one thing on all our uniforms that is the same regardless of which environment we serve in: the Canadian flag—the core of which revolves around the three concepts that we identify with: voluntary military service, unlimited liability, and service before self.[29]

Expertise is defined as the abstract body of knowledge that CAF members possess. Expertise is interconnected with our shared value of duty. Duty means fulfilling your obligations as a military professional, "always in agreement with legal principles and other values of the military ethos."[30] In other words, this means having "a highly developed capacity for judging when to use military force."[31] Like any other professional organization, CAF practises a craft and for the military professional that craft is the art of war. Like identity, expertise is more encompassing

than a member's trade and the special skills it takes to operate within the member's occupation. Therefore, members of the profession of arms must possess a "common body of military knowledge, supporting knowledge and specialized knowledge."[32] This knowledge follows a natural progressive path: learn the profession, practice the profession, and lead the profession. Early in a member's career, CAF focuses training on technical knowledge and expertise required for the member to operate and lead within their occupational speciality. As the member rises in rank and responsibility, the expertise required to function is expanded into strong military and organizational knowledge, education, and information. At the most senior NCM rank levels, the expertise is about strategy and institutional knowledge, which is necessary to function within a joint environment while at the same time understanding the manoeuvrings of government as well as comprehending the differences when CAF is inserted within DND.[33]

I am a professional within the profession of arms! Duty, loyalty, integrity, and courage are no longer words that roll off my tongue when asked if I can name them; rather, they are standards of behaviour that I do my utmost to live by, every day and in everything I do, whether in or out of uniform.

Today, I am proud to say I unequivocally accept the concept of unlimited liability; I possess a specialized body of military knowledge and skills; I act in accordance with the set of core values and beliefs found in the military ethos and I have truly embraced the belief that duty entails serving Canada before self. I am a professional within the profession of arms! Duty, loyalty, integrity, and courage are no longer words that roll off my tongue when asked if I can name them; rather, they are standards of behaviour that I do my utmost to live by, every day and in everything I do, whether in or out of uniform. As stated at the beginning of this article, I did not necessarily join CAF understanding this abstract thing called "military ethos," but through our NCM corps' systematic education and training system as well as some amazing leaders, I was taught the true meaning behind the underlying sentiment that informs our belief system and the standards of behaviour that accompany our shared values. Now when I state I am a professional within this great profession, I know in my heart that I have earned this title and I wear it with pride. Nonetheless, my obligation as a senior leader does not end simply because I can now explain *Duty with Honour*; I must teach and continue to practise these values and principles in our organization, like so many senior NCMs before me. I conclude with this principle of altruism: duty is no more complicated than the Golden Rule, "do unto others as you would have them do unto you."[34] It is about choosing the harder right over the easier wrong. Duty with honour is about respecting the dignity of all, serving Canada before self, and obeying and supporting lawful command.

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ABBREVIATIONS

CAF	Canadian Armed Forces
CWO	chief warrant officer
DND	Department of National Defence
NCM	non-commissioned member
PD	professional development

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Flying in the Peripherals: The Use of Aircraft in Small Wars

Officer Cadet Mitchell Hewson

Editor's note: This paper was written by a cadet attending the Royal Military College of Canada in fulfilment of one of the requirements for HIE 478, Small Wars.

INTRODUCTION

In today's modern conflicts, aircraft are rarely seen in combat with each other. Nations that possess aircraft capable of aerial combat will usually not undertake a war against another state with the same capabilities. The destruction that a modern military, especially an air force, can bring down is incredible. Where aircraft have found their use in modern times is in smaller conflicts. These small wars involve a powerful nation engaged in irregular warfare. The history of air combat focuses on the World Wars. What is missed by most is the development of air power in small wars between these two massive confrontations. This article explores how the use of air power developed in two conflicts during the 1920s: the Nicaraguan Campaign in 1927 by the United States Marine Corps (USMC) and the policing of Mesopotamia by air by the Royal Air Force (RAF). Each conflict is defined; the goals of the belligerent parties are examined through the lens of air power, and an assessment is made of each campaign's effectiveness. Finally, connections will be made between the air warfare in small wars in the 1920s and today's conflicts.

Before any further discussion takes place, two terms that will be used frequently in this article need to be defined: air power and small wars. As James Corum and Wray Johnson state in *Air Power in Small Wars: Fighting Insurgents and Terrorists*: "airpower [in small wars] is defined as all forms of aviation employed to combat insurgents and terrorists. In this sense, airpower includes the aircraft of air forces and of armies and navies ... ."[1] Corum and Johnson's work also offers an excellent definition of a small war: "any conflict against non-regular forces such as guerrillas, bandits, rebellious tribes, or insurgents of various stripes."[2] Both of these definitions are clear and will be used for this article.

Aircraft were used as early as 1913 to support the fight against irregular enemies. The French army deployed a contingent of aircraft to Morocco to support a French intervention against native peoples resisting French authority.[3] The development of air power in small wars was stalled by the start of the largest conflict that the world had ever seen.

The First World War was a proving ground for aircraft and many theories associated with their employment. The capabilities of German, French and British aircraft increased rapidly, due to the need to constantly outgun the enemy and establish air supremacy. By the end of the war, aircraft could fly further, carry more ordnance and impact the situation on the ground from the tactical to the strategic levels. What is interesting about the development of aircraft as a vehicle in combat is that it had yet to be proven effective in smaller theatres before it was used in mass conflict. After the war, air power had to prove itself again to maintain the value it had earned during the Great War. The American and British militaries both employed aircraft in small wars during the interwar years.

NICARAGUAN CAMPAIGN

The United States (US) had a long history with Nicaragua before they deployed large numbers of Marines to support the faltering government in 1926. There had been an American military presence in the small Caribbean country as far back as 1853, and there had been a continuous military contingent stationed there since 1910.[4] The incursion in 1926 was brought on by growing tensions between two of Nicaragua's longest political rivalries: the Liberals and the Conservatives. Max Boot notes that this rivalry "was based less on ideology than on blood and soil, pitting two of the countries principal cities (Liberal Léon versus Conservative Granada) against each other."[5]

A Conservative coup had toppled the previous Nicaraguan government in late 1925, sending the Liberals into a revolt. The political jockeying that followed resulted in the Americans supporting an appointed interim Conservative leader, while Mexico backed a Liberal who was proclaiming himself to be the rightful ruler. With fears of Mexico leaning further to the left of the political spectrum as well as possible threats to the Panama Canal and American businesses in Nicaragua, 2,000 US Marines were dispatched to Nicaragua in early 1927.[6] The Marines eventually found themselves engaged in a fairly bloodless cat-and-mouse war with Nicaraguan revolutionaries, who had pledged allegiance to their leader, Augusto C. Sandino. Unhappy with the political proceedings in his country and aligning himself with neither the Liberals nor the Conservatives, Sandino and his Sandinistas took up arms against the Americans in the name of "Latin American nationalism of the anti-Yanqui variety."[7] For the Americans, the conflict in Nicaragua had descended into a counter-insurgency operation.

Now that the groundwork for explaining the conflict has been set, the article will now assess how the Marines in Nicaragua used the aircraft available to them to fight a small war against Sandino's "bandits." The first encounter that the Marines had with the Nicaraguan revolutionaries en masse was the Battle of Ocotal on 15–16 July 1927, when hundreds of Sandino's fighters infiltrated the small village of Ocotal in the north of Nicaragua. The village was being garrisoned by 48 Nicaraguan National Guardsmen and 41 US Marines.[8] The next day, USMC aviation assets arrived on scene and, by using a primitive form of dive-bombing, routed the Sandinistas. The Marines flew single-engine, multipurpose DH-4 biplanes, which were armed with only four 25-pound [11 kilogram] bombs and two machine guns: one forward facing and the other rear-facing.[9] While this type of armament is considered inconsequential by today's standards, the air attack launched by the Marines was enough to send the Sandinistas running. The collapse at Ocotal proved to Sandino that trying to fight the Marines toe to toe would be disastrous, in no small part because of the use of air power.

The loss at Ocotal did not stop Sandino from continuing his campaign against the Americans. The rebel leader fell back on the classic tactics of guerrilla fighters: conducting hit-and-run attacks and avoiding large-scale confrontation. This forced the USMC air contingent in Nicaragua to develop new uses for its aircraft. Because there were no more engagements like the one at Ocotal (where the enemy was clearly identifiable and, therefore, could be targeted) and because of the political implications of unnecessary Nicaraguan civilian deaths, pilots were required to identify guerrillas before engaging them. Major Ross "Rusty" Rowell, commander of Marine Aircraft Squadrons, 2nd Brigade, encouraged his pilots to go to great lengths to positively identify the enemy.[10] In an annual report dated 20 June 1928, Major Rowell wrote that Marine aircraft would approach suspicious locations "from behind hills or mountains, the planes gliding in with throttled engines" in order to sneak up on the suspicious individuals.[11] Such tactics brought Marine aircraft and pilots well into the range of small arms fire from the ground but were necessary to assure positive identification of the enemy. It can be argued that this type of reconnaissance helped keep the Nicaraguan guerrillas on the run and fostered a respect for the power of aircraft.

The war against Sandino also forced the aircraft into a new role: air ambulance. On 19 December 1927, two columns of Marines were ambushed and sought refuge in the town of Qualili. Located at the base of a number of hills, defending the town was next to impossible, and before long, it was under siege by Sandino's guerrillas.[12] The Marines had suffered casualties during the ambush, and many were in no condition to travel via mule to the closest American medical installation. The only hope was resupply and medical evacuation from the air. An airstrip was established within the town and nearby forest that was suitable for the Marine's O2U-1 Corsair biplane to land on. Soon, Marine First Lieutenant Christian F. Schilt was flying in and out of

First Lieutenant Christian F. Schilt beside his Vought O2U-1 Corsair. Photo: USMC

the isolated unit's location, bringing in 1,400 pounds [635 kilograms] of supplies and evacuating 18 wounded Americans. All this in an aircraft that needed to be pulled to a stop by troops running alongside it after it landed because of a lack of brakes. First Lieutenant Schilt was awarded the Medal of Honor for his heroics.[13]

Aircraft were also key to the democratic process in Nicaragua. Although the guerrilla war continued, USMC aircraft supported the Nicaraguan national elections in 1928 and again in 1932. Johnson writes that "it was necessary to ferry by plane most of the American personnel to outlying districts, to supply them there, to maintain communication with them, to patrol the towns and mesas on registration and election days, and, finally, to bring to Managua the ballots."[14] Aircraft were able to speed up the logistics associated with the elections in Nicaragua, thus adding a level of legitimacy to an election that needed to be as transparent as possible. Although Sandino denounced the legitimacy of the election and wanted the people of Nicaragua to boycott it, nearly 90 per cent of the registered voters of Nicaragua turned up at the polls on election day. Even the defeated Conservatives recognized the election as one of the fairest in the nation's history.[15]

The USMC was able to employ aircraft extensively in the Nicaraguan Campaign of the mid 1920s in a fashion not previously seen. Much like bomber aircraft that were conceptualized and tested to a limited extent in the First World War and then became crucial to the war efforts of belligerent nations in the Second World War, aircraft—as tools in small wars—were tested by the French in their colonies before the First World War but were truly proven useful by the USMC in Nicaragua. They proved that aircraft could be employed for reconnaissance, support to the civil power and close air support to friendly troops on the ground. Even in these early years of aviation, the Americans respected the aircraft's capacity for destruction. They took every precaution to identify targets as hostile before engaging, perhaps foreshadowing the difficulties faced by 21st century airmen and airwomen. The British, on the other hand, took a more destructive approach in how they would employ their aircraft in an effort to police their vast empire.

POLICING OF MESOPOTAMIA

At the end of the First World War, the United Kingdom (UK) found itself in possession of the largest empire on the planet. The destruction of the German and Ottoman Empires left large expanses of Africa and the Middle East in British hands. The extent of the British Empire was so vast that Lord Curzon, a staunch imperialist, declared "The British flag never flew over more powerful or united an Empire than now; Britons never had a better cause to look the world in the face; never did our voice count for more in the councils of the nations, or in the determining the future destinies of mankind."[16]

The difficulty with administering such a vast empire is that it was almost too big to control. Many of the British colonies were months of sailing away from the UK, and enforcing British policy in these areas had proven difficult in the past. Aircraft would again prove their use in small conflicts during the post-war years, by providing the British with a means to effectively police their empire for a fraction of the cost of other means.

Remarkably, the RAF almost ceased to exist after the armistice in 1918. Army Generals and Navy Admirals saw aircraft as useful, but only to achieve the ends of the army and the navy. The fact that the RAF managed to hang on to its independence in the post-war years created the right circumstances for it to flourish into a vehicle to administer the British Empire. This new development for the use of aircraft ushered in a new dimension of air power, one where the use of air power alone (or almost alone) could bring dramatic effect to the situation on the ground.

The British employed aircraft in many of its colonies in the years following the First World War. This article examines just one example of the British use of air power and aircraft and juxtaposes it with the American example in Nicaragua. The key point for this discussion surrounds two principles: the cost of employing the aircraft in imperial policing duties and the effectiveness of those aircraft in that role. As Barry Renfrew notes in *Wings of Empire*, "more beguilingly for British officials and taxpayers, air power was cheap; air policing promised success for a fraction of the cost in money and British lives consumed every year by colonial land campaigns."[17] The imperial campaign that will be studied is the British involvement in Mesopotamia in the 1920s.

The British took charge of modern-day Iraq after the fall of the Ottoman Empire in 1918. Before the end of the year, they were bombing Iraqi cities and tribes for refusing to conform to their new ruler's wishes. These attacks included the Shia Muslim holy city of Najaf, which had had an uprising, and a tribe in the middle Euphrates a few months later, which had refused to pay taxes.[18] Whether these initial attacks helped or hurt the British mandate, a semblance of stability was still imposed on Iraq in the early post-war years. Around that time, there were calls in British Parliament to re-evaluate how the military was going to administer and police the vast British Empire. The same year as the first British punitive bombing attacks, the British High Commissioner for Iraq, Lieutenant Colonel Sir Arnold Wilson, had proposed that responsibility for internal security be given to the RAF.[19] He received much needed support from a political powerhouse in the UK: Sir Winston Churchill. Churchill was a big supporter of the RAF and its role in the colonies, declaring before the House of Commons in 1919 that "the first duty of the RAF was to garrison the Empire."[20] He even went so far as to say that the British military contingent in Mesopotamia should be commanded by a general officer commanding from the RAF, a statement that greatly angered old-school army brass.[21] The idea could also prove favourable with the British public, as the war-weary nation saw the possession of colonies, like Iraq, as an unnecessary drain on money and lives. If an air force could provide imperial policing solutions for a fraction of the cost in lives and money, the British voter would surely accept it. Hugh Trenchard,

Marshal of the Royal Air Force, created a plan that would have RAF aircraft in all corners of the empire, making the peoples of the colonies feel that they were constantly observed from an eye-in-the-sky. Unruly tribes could expect bombing raids within hours of being spotted.[22]

"Air power played a great role in containing that initial uprising and the following counter-insurgency campaign."

The opportunity for the RAF to prove itself in the colonies emerged in 1920. The year brought widespread revolt against the British Empire in the Middle East. The multiple ethnic and religious groups that dotted the Middle East objected to the latest European encroachment upon their land. The decision to draw lines on maps and create countries that did not reflect their ethnic and religious backgrounds also proved to be a mistake on the part of the British. The British colonial forces almost collapsed that year, even though they fielded a vast army in Mesopotamia that included 30 infantry battalions, 5 cavalry regiments, 18 artillery batteries and 2 RAF squadrons.[23] Air power played a great role in containing that initial uprising and the following counter-insurgency campaign.

As Renfrew writes in his book on air power in the British colonies:

> Air power was vital in helping British forces hold on in the first chaotic weeks of the uprising. Planes aided the trapped army force at Rumaithah with low level attacks against encircling insurgents. Flight crews dropped provisions to the detachments as its supplies ran low. Wooden boxes crammed with food, cigarettes and medicine were tossed out as planes swooped at 50 feet [15 metres] over the army perimeter.[24]

Tactics to be used against the insurgent tribes were constantly developed during the air campaign. Eventually, bomber crews would employ a deadly cocktail of light and incendiary bombs against insurgent villages:

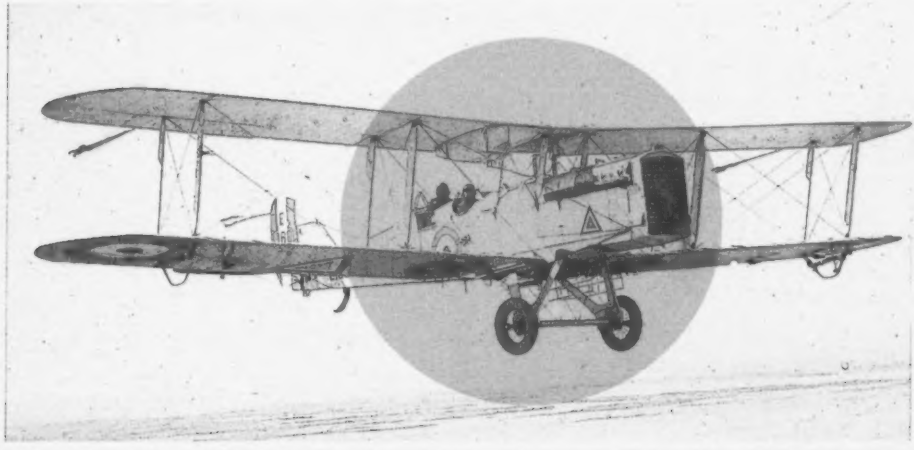
> Bombing techniques were adapted and honed as pilots learned to pursue groups of mounted insurgents or how to wrinkle out gunmen hiding in palm groves. Planes generally carried 20 pound [9 kilogram] bombs, the smallest in their arsenal, because they proved the most effective against people and light shelters or huts. Incendiary bombs were used to attack villages. Tins of petrol were dropped to accelerate the blazes started by fires.[25]

The revolt in Mesopotamia shook the British sense of invincibility in their colonies, but aircraft proved indispensable in maintaining the British presence in Mesopotamia. After the initial insurrection had been stopped, the chief British representative in Baghdad wrote that "aeroplanes have been the saving of us. Without them I really believe we should be out of Baghdad by now."[26]

Aircraft continued to play a great role in the continued fight against Mesopotamian tribes in the 1920s. The RAF enlisted the help of the famous T. E. Lawrence, better known today as Lawrence of Arabia, for the creation of an aerial bombing campaign against insurgent tribes. Trenchard and Lawrence "devised a plan for the 'bombing without occupation' security policy whereby the Army's punitive column could be completely dispensed with while achieving the same effect on the target civilian populace."[27] Their theory proved to be effective. To this day, the RAF Staff College still uses the Lawrence/Trenchard example as the prime example of utilizing air power on a small, or even large, scale.[28]

As the British occupation in Iraq continued, the role of aircraft expanded further to include more than just punitive bombing missions. Aircraft became key to resupplying outposts in the Iraqi desert and to mapping the uncharted landscape. Furthermore, they were key tools in gathering intelligence in a huge area of operations. Timely and accurate intelligence gave the British mandate the ability to make not only sound military decisions but also good economic and political decisions. High Commissioner Percy Cox reports in his year-end recap of events in Iraq in 1923:

> Without air transport, the niceties of administrative and military touch are impossible with other existing means of travel in Iraq, and perhaps the greatest achievement of Air Control in Iraq during the six months under review has been the introduction of this inestimable asset. By its means it has been possible to achieve a highly centralized yet widely understanding intelligence, which is the essence of wise economical control.[29]



An RAF Airco DH9A converted to an air ambulance, in Mesopotamia. Photo: Wikimedia Commons

CONCLUSION

Sir Percy's quote is telling of what air power had become for the British in Mesopotamia. In relation to the American use of air power in Nicaragua around the same time, there are similarities but there are key differences as well in their development and use. The Americans had the support of ground forces in the tactical role as the key reason to employ aircraft in Nicaragua. The success of the Marines fighting on the ground was the be-all and end-all for those in the air. The aircrew also showed much restraint in how they used aircraft as offensive weapons against the Sandinistas, choosing only to attack when the chance of collateral damage was at a minimum. The British, on the other hand, took aircraft to Mesopotamia with the goal of using them as a strategic tool. Once the insurrections of 1920 had died down, there were fewer instances of RAF aircraft supporting troops on the ground because the few that were posted to Iraq were spread over a huge area of operations. The air-to-ground role that the British aircraft and airmen took on was usually against an enemy that was nowhere near British troops and was punitive in nature. The morality of these retaliatory attacks is disputed to this day.

The British and the Americans did have similarities in their employment of aircraft in the two aforementioned campaigns. Both used them effectively in logistical-support and intelligence-gathering roles. The terrain in Mesopotamia and Nicaragua is difficult to operate in for ground forces. The former can ascribe this difficulty to its sheer size, while the latter can thank the massive mountains and impenetrable forests. These facts created the perfect setting for aircraft and crews to become proficient in the logistical-support and intelligence-gathering roles. This proficiency paid dividends in both campaigns.

The final note that needs to be taken from this comparison is how relatively little has changed with regard to the employment of aircraft in small wars in the years between the First and Second World Wars and how air power is used to combat irregular forces overseas today. In the recent conflicts in Iraq and Afghanistan, coalition forces used air assets for tactical-level resupply with helicopters and fixed-wing aircraft capable of delivering supplies via parachute. These assets were key to keeping the various International Security Assistance Force (ISAF) combat outposts fully supplied. Aerial resupply kept ISAF convoys off the improvised-explosive-device filled roads and, in turn, saved lives. Just like in Nicaragua, coalition helicopters were called upon to evacuate wounded soldiers from the battlefield and, less routinely, were capable of recovering downed pilots in enemy territory. The recovery of downed pilots with aircraft was extremely common in the deserts of Iraq in the 1920s, with pilots often making emergency landings within a few hundred yards [few hundred metres] of the enemy insurgents in order to recover their comrades.[30]

In terms of directly engaging the enemy, air power was a critical aspect of the American counter-insurgency operations in Iraq and ISAF's operations in Afghanistan. Troops on the ground had the ability to call in accurate airstrikes on enemy locations, and to lethal effect. This type of close air support for armies engaged in small wars clearly has its roots with the RAF in Mesopotamia and the USMC in Nicaragua.

The conflicts in the Middle East in the 21st century also saw the growth of the unmanned aircraft (UA) as an effective air power asset in a small war. These very high-tech aircraft are still providing commanders with nothing more than what the canvas-and-wood biplanes of the inter-war years provided, albeit much more efficiently. Their abilities to loiter in place for long periods of surveillance and then to strike with air-to-ground munitions have become so integral to fighting a small war that Central Intelligence Agency Director Michael Hayden refers to the use of UAs as "part of the American way of war."[31]

The similarities between air power in small wars in the 1920s and the 21st century are uncanny, but capabilities have improved significantly over the near century since the conflicts in Nicaragua and Mesopotamia. Aircraft are more capable than ever at delivering the supplies to keep the troops fighting, providing friendly forces with accurate and timely intelligence on the enemy, supporting the movement of troops and materiel around the battlefield and delivering crushing blows through accurate aerial attack. When combined, these tactical capabilities create a strategic effect that helps a nation achieve its political end.

Having graduated from the Royal Military College of Canada in 2017 with a Bachelor of Arts (Honours) in History, now Second Lieutenant Hewson is currently undergoing Phase 2 pilot training.

ABBREVIATIONS

ISAF	International Security Assistance Force
RAF	Royal Air Force
UA	unmanned aircraft
UK	United Kingdom
US	United States
USMC	United States Marine Corps

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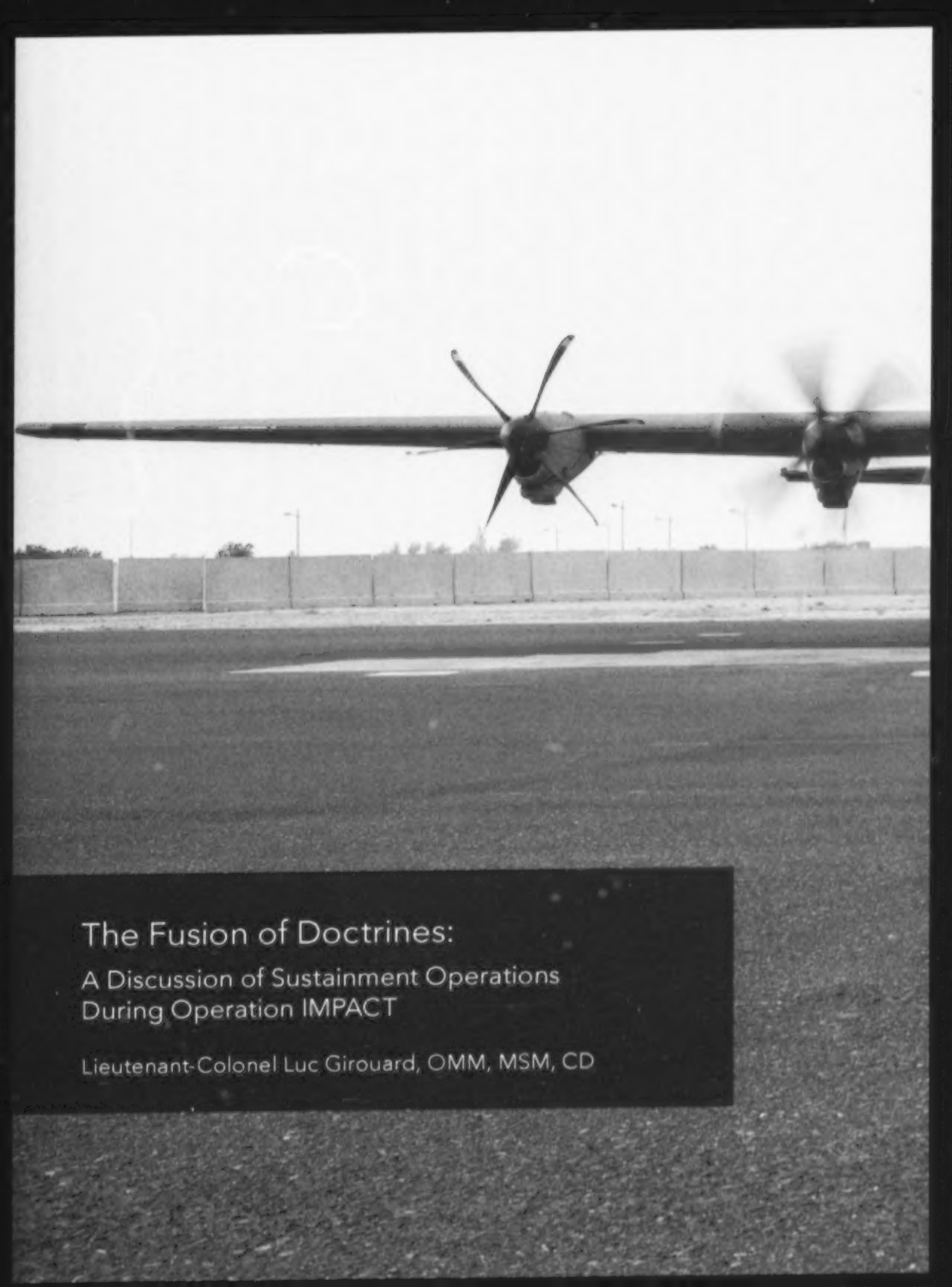
31. Michael V. Hayden, "To Keep America Safe, Embrace Drone Warfare," *New York Times*, February 19, 2016, accessed September 13, 2017, https://www.nytimes.com/2016/02/21/opinion/sunday/drone-warfare-precise-effective-imperfect.html?_r=0.



The Fusion of Doctrines:

A Discussion of Sustainment Operations During Operation IMPACT

Lieutenant-Colonel Luc Girouard, OMM, MSM, CD

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Photo: DND

INTRODUCTION

The Canadian Armed Forces (CAF) has certainly maintained an intense operational tempo over the last decade or so. This trend is most likely to endure, and as such, we can expect that CAF will continue to conduct operations in volatile and complex environments. These operations will undoubtedly continue to demand a flexible and responsive CAF support framework in order to support the needs of a versatile warfighting force that can be rapidly organized and configured for each specific mission.[1] Based on this idea, we can infer that the ability to sustain operations should persist as one of the main concerns of commanders (comds) at all levels. In fact, Comds of the Canadian Army (CA), Royal Canadian Navy (RCN), Royal Canadian Air Force (RCAF) and Canadian Joint Operations Command (CJOC) have recognized the need for their own environmental and joint sustainment doctrine and have produced key foundational publications in recent years.[2] While the environmental sustainment doctrine of each respective comd is focused on the sustainment of their own deployed forces, the joint sustainment doctrine from CJOC focuses primarily on providing support at the operational and tactical levels of expeditionary operations; it has been harmonized with CAF joint doctrine as well as with each environmental comds' sustainment doctrine.

Aim

The aim of this article is to add to the sustainment-operations discussion by using a recent example of an ongoing CAF expeditionary operation as well as examining how complex support operations can be and how challenging the fusion of these sustainment doctrines can become when applied practically in theatre. It will also describe how flexible tactical-level solutions can be implemented in order to overcome those challenges.

Background

In October 2014, Joint Task Force – Iraq (JTF-I) deployed to Kuwait as part of Operation (Op) IMPACT, the Canadian contribution to the United States–led coalition to degrade and defeat the Islamic State of Iraq and Syria. JTF-I's force elements were comprised of a joint task force (JTF) headquarters (HQ); a national intelligence centre (NIC); a joint task force support component (JTFSC); and an air task force (ATF), complete with its operations-support element (OSE), force-protection element (FPE), mission-support element (MSE) and its three air detachments (dets): long-range patrol (LRP), air-to-air refuelling (AAR) and fighter. Air Task Force – Iraq (ATF-I) also had a coordination element in the combined air operations centre.

ELEMENTS OF COMPLEXITY

Doctrine

The fact that each force element within JTF-I deployed under the guidance of its own sustainment doctrine brought in itself a level of complexity to support operations. As such:

a. JTF-I HQ operated under the framework of CONPLAN JUPITER, a CJOC-owned contingency plan (CONPLAN) that describes how CAF will lead and conduct full-spectrum operations.[3]

b. JTFSC operated under the doctrinal framework of B-GL-005-400/FP-001, Canadian Forces Joint Publication (CFJP) 4.0, *Support*.

c. The MSE within ATF-I operated under the doctrinal framework of B-GA-402-003/FP-001, C*anadian Armed Forces Air Doctrine: Force Sustainment*.

d. Although Operational Support Hub – Kuwait (OSH-K) was established prior to the launch of Op IMPACT and prior to the publication of CFJP 4.0, *Support*, it certainly operated under the doctrinal framework of that joint sustainment doctrine.[4]

The JTF-I force elements arrived in theatre knowing what they were supposed to look like and how they were supposed to be organized. However, it was not necessarily well understood how each force element would actually work together (i.e., be integrated/fused) in accomplishing the mission from a support perspective.

Geographical Separation and Dislocation

Logically, most support and sustainment arrangements were organized along the lines of the aforementioned doctrines and CONPLAN. However, geographical separation of operating bases within the theatre of operations and the dislocation of certain force elements are other complicating factors that challenged the in-theatre support architecture for Op IMPACT. As such, JTF-I force elements were situated as shown in Figure 1 and Table 1 and organized as shown in Figure 2.

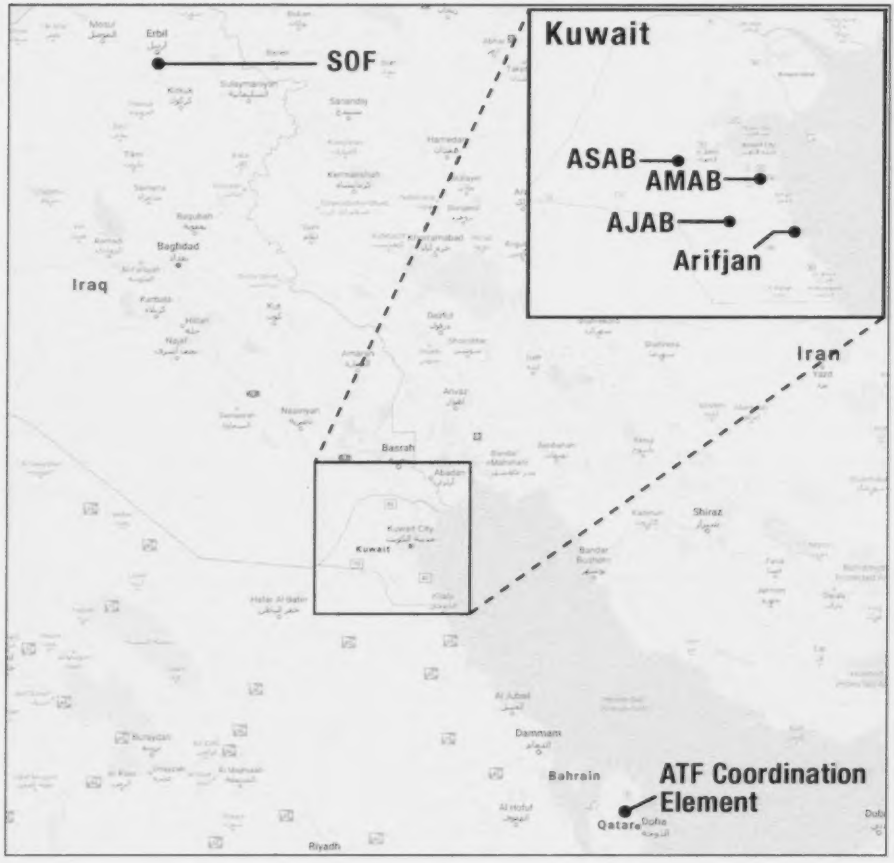


Figure 1. Geographical dispersion of JTF-I

Location in Kuwait	JTF-I Force Element(s)
Ali Al Salem Air Base (ASAB)	• JTF-I HQ • JTFSC (main) • LRP Det • AAR Det (less CC150T) • NIC • SOTF LO Det
Ahmed Al Jaber Air Base (AJAB)	• ATF-I HQ • OSE • MSE • JTFSC (det) • Fighter Det
Abdullah Al Mubarak Air Base (AMAB)	• CC150T (belonged to the AAR Det at ASAB)
Camp Arifjan (at the Combined Joint Task Force HQ)	• CAF/JTF-I embeds

Table 1. Location of JTF-I's Kuwaiti force elements

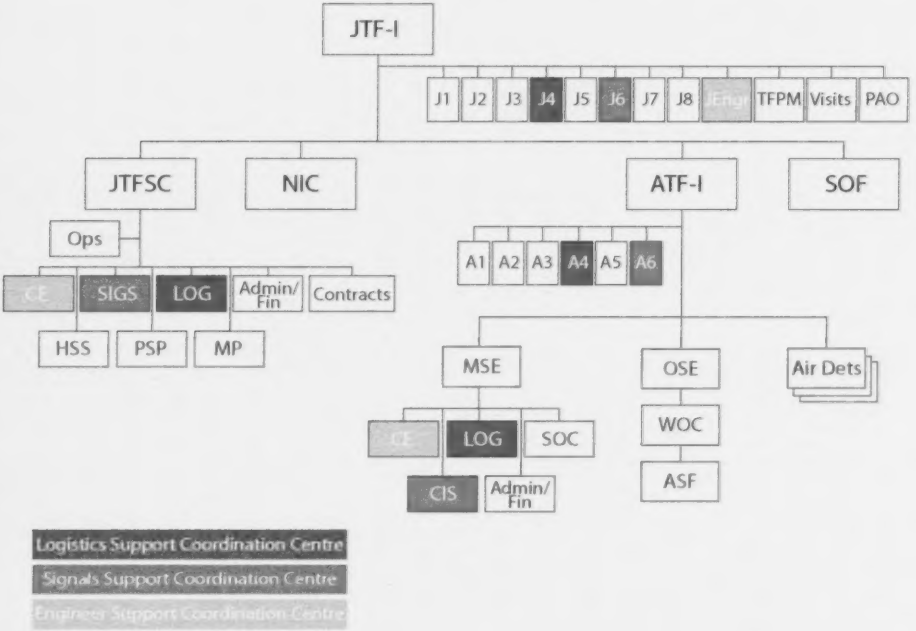


Figure 2. JTF-I organization

The flexible and agile nature of the support organizations (such as the OSH-K, JTFSC and ATF's MSE) allowed them to surmount this added complexity, thus enabling combat operations. But this did not occur without friction, as in-theatre support arrangements were adjusted to cope with the geographical separation and dislocation. At times, the results were at odds with specific areas of environmental- and joint-support doctrine. More specifically, the ATF MSE was centrally located in AJAB, where the bulk of ATF assets were situated. Hence, JTFSC personnel situated in AJAB were supported, from a survivability (first-line support) perspective, by the MSE. On the other hand, ATF personnel in ASAB were supported (first-line support) by the JTFSC. Both of these local support arrangements were absolutely necessary and unavoidable, yet they remain contrary to certain tenets of the support-and-sustainment doctrines mentioned above. Another example is the fact that the only engineering capability in the Op IMPACT theatre was resident within the JTFSC and was situated in ASAB. In other words, the ATF's MSE, which usually has its integral airfield engineering flight, did not deploy with its engineering assets. In essence, the JTFSC would provide engineering support to the entire JTF, based on the JTF-I Comd's priorities, which always accounted for the ATF Comd's needs. Ironically, in the early days of Op IMPACT, the JTFSC's engineering troop was mainly force generated and commanded by personnel from the RCAF's high-readiness MSE from 17 Wing Winnipeg. Again, this necessary support arrangement, which had been pre-approved by CJOC and 1 Canadian Air Division, was somewhat contrary to support-and-sustainment doctrine.

The departures from doctrine highlighted above are just a few examples of necessary support arrangements at the tactical level. They were necessary in order to cope with complicating factors (such as the ones mentioned in this article), other strategic-level constraints imposed on operational-support structures and required personnel-resource efficiencies.

Commencement of Air Operations Versus Theatre-Opening Demands

Considering the politico/strategic context of the fall of 2014 and given the rapidity of the Op IMPACT deployment, it is evident that there was some urgency in commencing CAF air operations in support of the US-led coalition. As such, as all JTF-I support organizations were striving to enable the swift commencement of air operations as per operational imperatives, they were also wrestling with the correspondingly important and multifaceted demands of conducting theatre-opening activities, adding yet another level of complexity to support operations.

For example, during the theatre opening of Op ATHENA in Kabul, Afghanistan, in 2003, the theatre-opening team, force generated by the Canadian Forces Joint Operations Group, deployed almost four months ahead of the lead elements of the Canadian battle group and well ahead of the start of Canadian operations. This allowed for the vanguard to focus only on opening the theatre. Of course, this is more of an ideal scenario rather than the norm. Op IMPACT was quite the contrary, where the focus in the early days of the operation was much more nuanced in the sense that meeting and enabling strategic objectives (i.e., starting kinetic air operations in support of the coalition) was the prime focus of the vanguard elements in theatre, over and above all the other survivability tasks that come with opening a theatre.

First Deployment of a Canadian JTF HQ–led Air-Centric Operation

This was the first time that CAF would undertake an operation in which an ATF (the combat component with its elements and air dets) would be under command of an ATF HQ under command of a JTF HQ and supported by a JTFSC on an expeditionary operation. JTF-I force elements and support organizations were required to swiftly enable mission success and conduct theatre-opening activities with doctrine that was being fused together for the first time in such a complex setting.

It would be interesting, in hindsight, to have a discussion panel with Op IMPACT JTF-I and ATF-I comds; learn of their experiences, challenges and thoughts about Op IMPACT command and control (C2); and hear from their perspectives about issues that would certainly go beyond the support and sustainment domains. Much could certainly be learned. It should be noted that subsequent Op IMPACT rotations have greatly benefitted from previous ATF-I comds and key staff as part of the 2 Wing–led Op IMPACT pre-deployment training for deploying ATF-I personnel.

ADDRESSING THESE COMPLEXITIES AT THE IN-THEATRE LEVEL

How were these foundational sustainment doctrines fused together at the tactical level within the joint operations area? Surely, the clash of these doctrines caused friction as the demands of theatre opening and Rotation (Roto) 0 were worked through, but how were these inevitable frictions surmounted by JTF-I in order to accomplish its mission? Although the answer may not be the be-all and end-all for every future mission, it can certainly be considered as a starting point for discussions.

From the onset of theatre opening and Roto 0 and considering the issues raised in the previous paragraphs, it was recognized that a massive amount of coordination was required at the intratheatre level when it came to supporting and sustaining JTF-I. This intratheatre coordination was also required to ensure that effective and efficient reachback was maintained with CJOC HQ and also with the Canadian Combined Aerospace Operations Centre when it came to RCAF-specific support-and-sustainment issues. Support and sustainment coordination at all levels was enhanced by a multitude of factors and the three major ones will be highlighted briefly.

EXISTENCE AND UNDERSTANDING OF SUSTAINMENT DOCTRINE

The very existence of those three doctrines (which enabled the deployed forces to have a start state and the basis for establishing an in-theatre support framework) and a greater understanding of all three doctrines by all personnel involved in providing support and sustainment were definitive enablers to the mission's success. It was apparent that personnel force generated for theatre opening and Roto 0 had, for the most part, come from CJOC, CA and RCAF high-readiness units such as 1 Canadian Division Headquarters; the Canadian Forces Joint Operations Support Group; 2 Service Battalion; and the RCAF's 2 Wing, augmented by the high-readiness elements (MSE and OSE) of 17 Wing supported by 8 Wing. Given their standing mandates, most of these units/formations were regularly exposed to each other on joint exercises, where they got to understand each other's doctrine from a support perspective. This undoubtedly paid important dividends during Op IMPACT. As the mission progressed, more Op IMPACT–centric pre-deployment training was put into place in order to prepare future JTF-I HQ and ATF-I personnel to operate in such a complex operational environment. Based on feedback, this training has allowed support organizations to hit the ground with a much greater understanding of the in-theatre support framework. These support-and-sustainment doctrines must become institutionalized and ingrained in RCAF sustainment personnel. With those foundational doctrines embedded in RCAF day-to-day operations and other RCAF training events, we will ensure the necessary institutionalization of these doctrines.

INTRATHEATRE COOPERATION

The personal efforts of most in enhancing intratheatre cooperation at all levels were a great force enabler. CAF personnel who participated in theatre opening and Roto 0 arrived with the typical CAF can-do attitude and steadfast dedication to the mission's success. They also arrived with expert knowledge and an open-mindedness, which proved to be significant contributing factors to the mission's success in that critical phase. Indeed, instead of anchoring and entrenching themselves within each of their respective doctrines, they were open to forging a way forward in order to fuse those three distinct doctrines in an intratheatre support-and-sustainment system that

seems to work. This aspect highlighted the premise that doctrine is not an end in itself but is a means to an end. The acceptance of this premise was a key enabler in creating and executing the functional coordination centres (CCs).

IMPLEMENTATION OF FUNCTIONAL COORDINATION CENTRES

Very quickly, a trend was recognized that most meetings and coordination efforts could be grouped by support functions which spanned the entire JTF-I. Most sustainment coordination meetings were centred on logistics-support issues, engineer-support issues and signals-support issues. Indeed, it was rapidly noticed that the more that JTF-I's force elements coordinated with each other, the more effective and responsive the support-and-sustainment architecture and associated processes seemed to work. In other words, the more each support organization knew about each other's business and requirements, the more they could make the existing doctrines work together. Unintentionally, these informal coordination meetings were allowing each force element's doctrine to work. In fact, in a roundabout way, they were validating each force element's doctrine. What was also being highlighted by the apparent benefits of these coordination meetings was the need for a more formalized structure.

This need for a more formalized structure (the CCs) did not require additional personnel within the tightly controlled JTF-I table of organization and equipment (TO&E). The formalized CCs were composed of existing key players within each support organization and were chaired or co-chaired by JTF-I HQ staff who ensured that plans aligned with JTF-I Comd's intent and priorities. In essence, without being depicted in the JTF-I's order of battle or in the Op IMPACT brick of the Canadian Forces Tasks Plans and Operations (CFTPO), the CCs were an "overlay" on JTF-I's actual organizational and C2 structures. The CCs were the forcing function that fused the three doctrines together and were established towards the end of the theatre-opening phase.

The Logistics Support Coordination Centre

The Logistics Support Coordination Centre (LSCC), see Figure 3, is co-chaired by the JTF-I J4 and the Commanding Officer (CO) JTFSC and includes representation from the JTF, JTFSC, MSE and ATF. The LSCC focuses on JTF-I's logistical-support issues across the full spectrum of logistics.

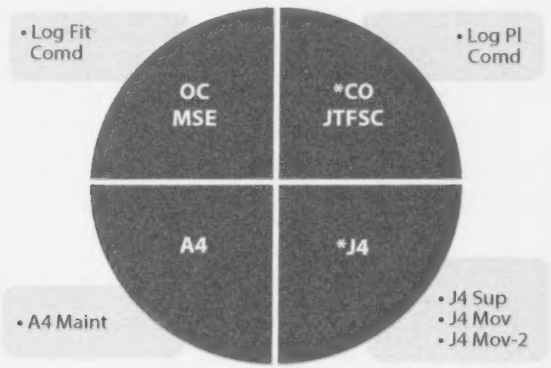


Figure 3. LSCC

The Engineer Support Coordination Centre

The Engineer Support Coordination Centre (ESCC), see Figure 4, is chaired by the JTF-I JEngr and includes representation from the JTFSC, MSE and JEngr. The ESCC focuses on JTF-I's engineer-support issues and establishes the priorities of and sequencing for projects.

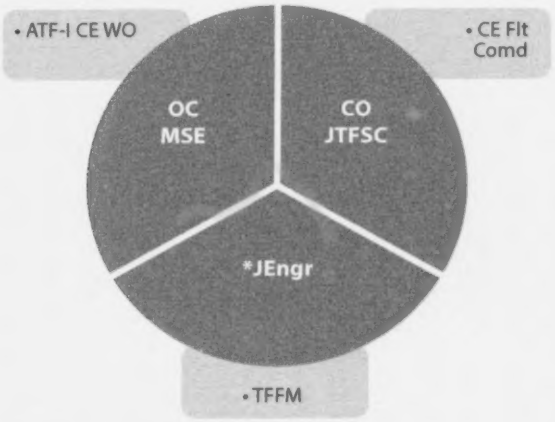


Figure 4. ESCC

The Signals Support Coordination Centre

The Signals Support Coordination Centre (SSCC), see Figure 5, is chaired by the JTF-I J6 and includes representation from the JTF-I, JTFSC, MSE and ATF. The SSCC focuses on JTF-I's signals issues and establishes priorities of and sequencing for projects as well as oversees capability development.

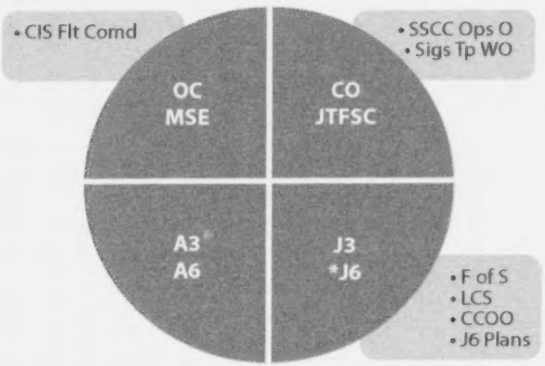


Figure 5. SSCC

CONCLUSION

The structure and effectiveness of implemented intratheatre, tactical-level solutions (such as the CCs implemented during Op IMPACT) have certainly evolved and will continue to evolve over subsequent rotations. The effectiveness of CCs will undoubtedly be influenced by the personalities involved and the evolution of the mission itself.

Hopefully, readers will understand how these foundational sustainment doctrines were fused together at the tactical level; how each element came together (with their own understanding of how to support themselves according to their own doctrine); and how, ultimately, the CCs worked together under one JTF.

Expeditionary sustainment operations are inherently complex, and that complexity is inevitably compounded by external factors which challenge the ability of deployed support organizations to enable mission success. Comds and support personnel, alike, face this complexity through the lens of their environmental or joint sustainment doctrine. Given the nature and scope of recent operations (such as Op IMPACT), we will most likely see the fusion of multiple environmental and joint sustainment doctrines and be forced to figure-it-out at the intratheatre level on future missions. Comds and support personnel have a better chance of mission success if they use their knowledge of sustainment doctrine as a means of enhancing flexibility when implementing tactical-level solutions to complex problems. In other words, doctrine, as important as it is, should be considered as a means to an end and not as an entrenching tool, nor as an end in itself.

Knowledge and experience are key in understanding doctrine, and we should encourage exposure to environmental and joint sustainment doctrine as often as possible through collective training events and exercises as well as other professional-development opportunities. In doing so, we will better prepare future leaders, who are leading or embedded within environmental- or joint-support organizations, to find flexible solutions to complex problems in the volatile and complex operating environments we expect to face in the future.

Lieutenant-Colonel Luc Girouard has been an air logistics officer for 23 years and has commanded at the MSE, squadron, wing, ATF and component levels. He has been the CO 2 Air Expeditionary Squadron and was most recently the CO JTFSC for the latter part of theatre opening and throughout Roto 0 of Op IMPACT. He is now the Deputy Commander of the Canadian Forces Joint Operational Support Group.

ABBREVIATIONS

A4 Maint	A4 Maintenance
AAR	air-to-air refuelling
Admin	administration
AJAB	Ahmed Al Jaber Air Base
AMAB	Abdullah Al Mubarak Air Base
ASAB	Ali Al Salem Air Base
ASF	airfield security force
ATF	air task force
ATF-I	Air Task Force – Iraq

C2	command and control
CA	Canadian Army
CAF	Canadian Armed Forces
CC	coordination centre
CCOO	coordination centre operations officer
CE	construction engineering
CFJP	Canadian Forces Joint Publication
CIS	communication and information systems
CJOC	Canadian Joint Operations Command
CO	commanding officer
comd	commander
CONPLAN	contingency plan
det	detachment
ESCC	Engineer Support Coordination Centre
F of S	foreman of signals
Fin	finance
flt	flight
HQ	headquarters
HSS	health services support
J4 Mov	J4 Move
4 Mov-2	J4 Move-2
J4 Sup	J4 Supply
JEngr	JEngineer
JTF-I	Joint Task Force – Iraq
JTFSC	joint task force support component
LCS	line communications superintendent
LO	liaison officer
Log	logistics
LRP	long-range patrol
LSCC	Logistics Support Coordination Centre
MP	military police
MSE	mission-support element
NIC	national intelligence centre
OC	officer commanding
Op	Operation
ops	operations
Ops O	operations officer
OSE	operations-support element
OSH-K	Operational Support Hub – Kuwait

PAO	public affairs officer
pl	platoon
PSP	personnel support program
RCAF	Royal Canadian Air Force
RCN	Royal Canadian Navy
Roto	rotation
Sigs	signals
SOC	support operations centre
SOF	special operations forces
SOTF	special operations task force
SSCC	Signals Support Coordination Centre
TFFM	task force fire marshal
TFPM	task force provost marshal
tp	troop
WO	warrant officer
WOC	wing operations centre

NOTES

1. B-GL-005-400/FP-001, CFJP 4.0, *Support*, 2-1.

2. The four publications were issued as follows:

   - CA – B-GL-345-001/FP-001, *Combat Service Support (CSS) Units in Operations* in 2013, accessed June 13, 2017, http://acims.mil.ca/sp/CADTC_DAD_AEL/DoctrineLibrary/Forms/AllItems.aspx;
   - CJOC – B-GL-005-400/FP-001, CFJP 4.0, *Support* in 2014, accessed June 13, 2017, http://cjoc-coic.mil.ca/sites/intranet-eng.aspx?page=3560;
   - RCN – Naval Logistics Publication 4.00, *Logistics Deployed Support* in 2015, accessed June 13, 2017, http://nshq.mil.ca/dgnsr-dgepsm/dnl-dlm/pol-pol-eng.asp; and
   - RCAF – B-GA-402-003/FP-001, *Canadian Armed Forces Air Doctrine: Force Sustainment* in 2015, accessed June 13, 2017, http://w08-ttn-vmweb01/CFAWC/en/doctrine/index.asp.

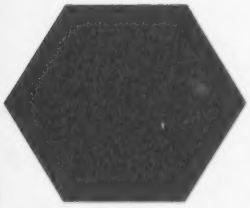
3. It is important to note that CONPLAN JUPITER is not sustainment doctrine. However, it does speak of sustainment in how the JTF HQ will be structured and the roles of its inherent J staff and how it will relate with the JTF component comds.

4. Also of note, OSH-K was not a JTF-I force element and, hence, reported to Comd CJOC not to Comd JTF-I.

RETHINKING RCAF SENIOR OFFICER PROFESSIONAL MILITARY EDUCATION IN THE 21ST CENTURY: LEARNING FROM THE PAST

DR. ALLAN ENGLISH

There has been a steep decline in Canadian Air Force professional military education (PME) programmes in the past decade, especially at the senior-officer level. The need to rectify this situation has been recognized by the senior leadership of the Royal Canadian Air Force (RCAF), and the requirement for a renaissance in RCAF PME was clearly articulated by the Commander (Comd) of the RCAF, Lieutenant-General (LGen) Michael J. Hood, in a recent issue of the *Royal Canadian Air Force Journal* (*RCAFJ*):



> I am, therefore, committed to exploring ways to expand our body of professional knowledge, to encourage self-development, and to provide opportunities for experiential learning. … I recently commissioned a paper by the Canadian Forces Aerospace Warfare Centre to look at airpower education and professional development as one of a series of academic pieces that will underpin a professional airpower mastery programme. Such a programme will ensure expert comprehension of airpower and the ability to apply that understanding effectively wherever and whenever needed.[1]

The paper sponsored by LGen Hood was written by a number of authors with expertise in air force PME and outlines some of the key issues to consider in rethinking air force education and professional development. The authors acknowledged that their "paper is not a plan proposal" but that "many of the pieces likely to figure in any solution are already in place."[2]

In the following paragraphs, I would like to offer a potential piece to the solution with a practical application of history, that is, examining what I believe to be the high point of senior officer air force PME in the 21st century—the final years of the Air Term of what is now the Joint Command and Staff Programme (JCSP) at the Canadian Forces College (CFC) and how the lessons we learned from that era could be applied to reinvigorate RCAF senior officer PME in the near future.[3] I focus on senior officer PME here because I believe that for a PME reform plan to succeed, the professional development of those who oversee the creation, initiation, delivery and sustainment of all other Air Force PME programmes should be prioritized.

Parts of this article are based on a presentation titled "The Rise and Decline of Canadian Air Force Professional Military Education in the 21st Century: Lessons for the Future" that I gave in Trenton on 3 November 2016 as part of the Royal Military College of Canada (RMCC) Department of History Symposium, the title of which was, "The Education of an Air Force, 1914–2014." A more detailed version of the presentation will be published in the future; however, I have put some of its key ideas in this piece in the hope that they may be of use to those involved in rethinking RCAF PME.

After the Second World War, the RCAF created an officer PME system that—by the early 1960s—was comprehensive and effective. Among other things, it aimed to "develop critical analysis skills; … train individuals in higher staff skills and methods; provide a background knowledge of armed forces organization and operations; and impart an understanding of the … application of air power and how best to integrate it with land and sea power."[4] This was achieved by "institutional investment in the intellectual capital of the RCAF, with a particular focus on airpower … [which was] … quite exceptional in comparison to today's approach."[5] However, following the integration and unification of the Canadian Armed Forces (CAF) in the late 1960s and early 1970s, the RCAF lost "control of higher air-staff training and airpower education …" with the creation of CFC and the introduction of a new "unified" Command and Staff Course (CSC) in 1966.[6] However, part of the RCAF Staff College's legacy of air power education for senior air force officers remained with the Air Term, which was part of the Staff College curriculum for

all air force officers until CSC 32 (2005–2006). The Air Term was a robust senior officer PME experience, and I argue here that, combined with current best practices in professional and university education, if selected parts of it were reintroduced into RCAF PME, Air Force professional development would be improved.

This article has four major parts: it first reviews the decline of Canadian air force PME post-unification; second, it examines the rise and decline of Canadian PME in the 21st century, third, it offers insights into the CSC Air Term 1998–2005; and finally, it concludes by making suggestions for quickly implementing a senior officer PME programme that meets the requirements enunciated by the Comd RCAF.

THE DECLINE OF CANADIAN AIR FORCE PME POST-UNIFICATION

The implementation of the newly unified CAF PME has not been studied in detail; however, we know that by the 1990s all was not well with CAF PME as highlighted by the Somalia scandal, the misconduct of some Canadian troops in Somalia.[7] Many factors in the 1990s, referred to as CAF's "decade of darkness," contributed to the call for major PME reform. However, the main impetus was the Somalia scandal and the subsequent recommendations of the Somalia Commission, which documented how deficiencies in Canada's military education system had contributed to the scandal. The commission concluded that previous attempts at PME modernization were "all form but no substance," and in 1997, an advisor to the Minister of National Defence (MND) characterized CAF officer PME like this:

> Canadian officers today are weak in history, theory and the practical application of military strategy. … [T]here is a dearth of both strategic thinking and forward planning generally. Almost all Canadian military intellectual activity concentrates either on the practicalities of doctrine, on tactical matters or on administration.[8]

Subsequently, the government mandated major PME reform that started in the late 1990s and was monitored by the MND.

Pooled ignorance. One of the criticisms of PME at CFC prior to 1998 was what one instructor at an American war college called "pooled ignorance" to describe the nature of learning in "what passes for a seminar" in certain United States (US) PME institutions. Pooled ignorance occurs when there is no subject matter expert (SME) participating in syndicate activities and where the syndicate members and directing staff have little or no expertise in the topic being discussed.[9] A Canadian observer of CSC seminars confirmed that something similar to pooled ignorance existed at CFC in the 1990s because students "operate on 'gut feeling' and past experience; they are not naturally innovative, resist change and prefer the status quo."[10] In the wake of these criticisms, one solution to reduce pooled ignorance that those of us working on curriculum reform after 1997 were able to implement with substantial success using the contract academic model was to ensure that academic SMEs were involved in as many learning activities as possible, especially seminar discussions, a stated goal of the original CFC academic hiring plan.[11] Integrating these SMEs into curriculum planning and learning activities was part of an overall plan to decrease "passive learning" (i.e., what took place when students attended the many lectures given in the Traynor Auditorium, which they called "the big blue bedroom") and increase active learning. A great deal has been written on the topic of active learning, going back to antiquity; as Confucius said: "I hear and I forget. I see and I remember. I do and I understand."[12] A very simple way of looking at this concept is that passive learning is teacher-centred while active learning is student-centred. This principle is echoed in the expectations of the Comd RCAF for future PME activities "to provide

opportunities for experiential learning."[13] Experiential and active learning are important parts of current best practices in professional and university education, which are supported by extensive online resources.[14]

The goal of the Canadian PME reform started in the late 1990s was to restore the nation's trust in CAF by using professional education as one means of creating a values-based profession of arms able to discharge its responsibilities effectively and ethically. The outcomes of this reform will be discussed next.

The Canadian Forces College, Toronto. Photo: CFC

THE RISE AND DECLINE OF CANADIAN PME IN THE 21ST CENTURY

There was significant improvement in both the quality and quantity of Canadian PME between 1998 and 2005 as a result of the post-Somalia PME reforms, including new Developmental Period 4 programmes (for colonels and navy captains) at CFC; university-level residential and online courses available to all CAF members through RMCC and selected civilian universities; and a special emphasis on ethics and the military profession in courses for all CAF personnel, including senior officers at CFC.[15] Changes to PME at CFC between 1998 and 2005 also conformed to the MND's direction by increasing the academic and professional content of the CSC, including, as mentioned above, using SMEs in curriculum development and delivery. Likewise, the Air Term was revised to reflect changes in the overall CSC curriculum, and it included more activities to improve students' critical analysis competencies as well as competencies and air power–focused knowledge that reflected the RCAF Staff College's educational philosophy: higher staff skills and methods, and imparting "an understanding of the … application of air power and how best to integrate it with land and sea power."[16]

However, in the absence of a central plan, progress was uneven in post-Somalia PME reform initiatives, as "there was no overarching departmental policy to … integrate military education into the Armed Forces."[17] At the same time, parallel to CAF in general, air force PME programmes suffered from a lack of "overarching policy to guide … units' activities," and "inadequate mechanisms were put in place" to institutionalize change "throughout the Air Force."[18] Furthermore, "where plans were put in place, a lack of consistent institutional leadership meant that they were often not carried out."[19] Progress began to falter in 2005, and shortly thereafter it came to an abrupt halt, followed by a decline. Contributing to this situation was the atmosphere of crisis that pervaded CAF from 2005 to 2011 due to the extreme pressures of simultaneously maintaining forces in Afghanistan engaged in high-intensity combat, dealing with the attendant casualties and integrating large amounts of new

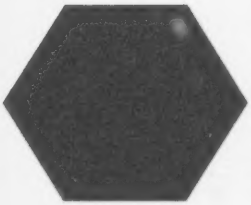
equipment. Consequently, maintaining—let alone improving—PME programmes was not seen as a priority. For example, the reduction in ethics and the military profession educational activities (as well as related law of armed conflict [LOAC]), the termination of the Officer Professional Military Education programme, major cuts to distance-learning resources at RMCC and the decline in the use of SMEs at CFC all contributed to the deterioration in Canadian PME at the beginning of the 21st century. These cuts threaten to dilute the post-Somalia PME reforms that were designed to ensure that members of the Canadian profession of arms are properly prepared to carry out their duties effectively and ethically in challenging and complex operating environments.[20] Two other factors contributed to the decline of Air Force PME at CFC starting around 2003: an emphasis on joint as opposed to component warfare and the move to adopt the operational planning process (OPP) as the focus of the CSC.

Everything is not joint! The decline of air force senior officer PME from about 2003 onward was exacerbated by the slogan "everything is joint," and it was used by some at CFC to justify major curriculum changes, culminating in the elimination of the Air Term for CSC 32 (2005–2006). This slogan epitomized a lack of intellectual rigour concerning key doctrinal concepts like "operational art" and "joint" and was frequently used to rationalize the new focus of the CFC curriculum, especially during General Rick Hillier's tenure as Chief of the Defence Staff (2005–2008) when he adopted a US Army boots-on-the-ground vision for CAF transformation. As a result, joint became "jarmy"—land-centric approaches to CAF doctrine and structures covered with a veneer of jointness. This jarmy version of warfare displaced the previous, more balanced approach to orchestrating the effects of land, sea and air power taught at CFC.[21]

Focus on planning. Combined with this jarmy approach to warfare at CFC was an increasing fixation on the OPP in the curriculum to the detriment of other senior officer professional requirements, as between 2002 and 2008 the amount of time allocated to the study of the OPP had more than doubled.[22] The OPP is a template-based, linear, step-by-step solution process that was designed to solve "difficult" problems that are amenable to this kind of problem-solving approach. However, most senior officers are required to deal with what have been called "wicked" problems, that is, social or cultural problems which must be addressed in a nonlinear fashion due to incomplete or contradictory knowledge, the number of people and opinions involved as well as the interconnected nature of these problems with other problems.[23] Wicked problems are fluid and changing by nature and do not have the fixed "end states" required by the OPP.[24]

Besides "operations," starting in 1998, CSC syllabi emphasized "leadership, the laws of armed conflict and ethics" in response to the Report of the Somalia Commission as directed by the MND.[25] By 2013, however, virtually all reference to ethics and the law of armed conflict had disappeared from the syllabus, and the emphasis was now on "military operations and operational planning, the study of leadership and command, and an understanding of the context of defence through national and international studies."[26] The reduction in educational activities devoted to ethics and the military profession at CFC was troubling to some, because we know that senior officers require advanced education in these topics if they are to meet the complex challenges posed by assuming high command and institutional leadership positions.[27]

The need for RCAF leaders to go beyond linear thinking, which frequently relies on formulaic approaches to problems based on precedent and customary ways of doing things, and to apply the critical analysis skills necessary to lead a learning organization open to challenging precedent and custom is explained by Randall Wakelam:



> We have developed a particular conception of air power; we need to know how that conception came to be, and why it is important to maintain and develop the institutional nimbleness that has helped Canadian air power to survive and evolve.
>
> ... [T]he air forces of Canada ... need to be learning organizations. Aviation is too young a profession to be able to fall back on centuries of culture and custom. As we make our own way we must think hard about the decisions that have been made along the way and if and how those decisions and their outcomes will help us through our second century.[28]

The increased emphasis in the CFC curriculum over the past decade on the linear thinking inherent in the OPP has impacted negatively on the development of the "critical thinking and analytical skills" necessary to deal with wicked or complex problems. In addition, the shift to a joint curriculum has deprived RCAF officers of an opportunity to think about the present and future state of their environment. The curriculum of the RCAF Staff College aimed to produce well-rounded senior air force officers with the intellectual abilities to be not only operations planners but also high-level staff officers and eventually higher commanders and institutional leaders.[29] Those of us involved in the design and delivery of the CSC Air Term attempted to emulate that philosophy with a curriculum that contributed to developing a well-rounded senior officer whose attributes included critical thinking, air power mastery and air power mindedness. Some key points about how this was done will be discussed next.

THE CSC AIR TERM, 1998–2005

The last Air Term was given in the academic year 2004–2005 as part of CSC 31, and from this point on, there was no rigorous study of air power at the senior-officer level in CAF, which "restricted ... [the Air Force's] institutional and intellectual development to the tactical level."[30] The Air Term comprised almost 20 per cent of the CSC 29 curriculum. The number of hours allocated to studying aerospace topics for JCSP 35 (2008–2009) was about 15 per cent of the number of hours allocated to the Air Term for CSC 29. It is highly unlikely that, given current attitudes towards senior officer PME at CFC, any air force PME will return there. Consequently, it is up to the RCAF to recreate an Air Term in some shape or form, if it is to happen at all.[31] I will now describe why the Air Term at CFC from 1998 to 2005 could serve as part of a possible model for future RCAF senior officer PME.

In order to avoid past failures in air force PME reform, a "coherent and dedicated approach to improvement is needed."[32] What follows are some highlights of the Air Term that might be considered in designing that approach based on the Comd RCAF's expectations for Air Force PME, which, as we have seen, include the need to achieve professional air power mastery, which consists of an expert comprehension of air power, the ability to apply that understanding effectively as well as the ability to contemplate and debate air power in terms of future force structure.[33] These expectations, especially a "mastery" of professional competencies at senior officer levels of air force professional development, mean that RCAF PME must reach the highest levels of Bloom's taxonomy of learning (i.e., levels 5 and 6 – evaluation and creation), in lieu of simple understanding or rote application of processes like the OPP. These learning levels were achieved in the Air Term.[34]

The Air Term curriculum, while having a planning component, was also designed to develop those competencies required to be an effective senior air force officer, that is, critical analysis, higher staff skills and methods as well as an understanding of air power and how to integrate it into joint

plans, as noted above. Topics included detailed study and critiques of Canadian and allied air doctrine as well as an overview of aerospace component operations, which was largely a description of the various roles the Canadian Air Force performed, as most of the students had very little detailed knowledge of roles outside their own specialty. The planning component, with its two major operational-level exercises, had an air focus, as most CSC major exercises were largely "jarmy," always ending with a "decisive, boots on the ground" land campaign as prescribed by imported US Army campaign doctrine. In the CSC final exercise, no alternative approaches to a "jarmy" campaign (e.g., a naval/air blockade, no-fly zones or a predominantly air campaign) were permitted, despite some suggestions that they might be reasonable options. Ironically, the Kosovo air campaign, various no-fly zones in the Middle East and the Libyan campaign demonstrated that these were precisely the types of operations that governments might prefer.[35] The Air Term curriculum also contained activities that allowed the students to gain an understanding of the unique aspects of leadership and command in an air force context.[36] In addition, as part of the curriculum contributing to the development of higher staff skills and methods, the Air Term activities included an air symposium.[37] This symposium gave students the opportunity to work as a team on a major project of relevance to CAF, something that was rarely done otherwise on the CSC, but was instrumental in preparing students to work as part of a team in higher headquarters.[38]

The Air Term was a robust senior officer PME experience that still provides useful lessons for future RCAF PME. I shall conclude by outlining how this experience might be applied practically.

CONCLUSIONS

The need to improve professional development in the RCAF, particularly its PME, has been recognized by the senior leadership of the RCAF. Preliminary steps have been taken to make this improvement, notably the publication of "Rethinking Airpower Education and Professional Development" in the *RCAFJ*, which outlines key issues to be considered in devising a plan to effect this change. The focus in the present article has been on senior officer PME because I believe that the professional development of those leading the change should be a priority. I have argued that the experience with the Air Term at CFC from 1998 to 2005, combined with current best practices in professional and university education, can provide valuable lessons for creating a new RCAF senior officer PME programme quickly.

The RCAF has always valued PME, and its post–Second World War senior officer PME represented a major "institutional investment in the intellectual capital of the RCAF"[39] and is clearly the envy of some of those contemplating improvements in today's RCAF professional development. The Air Term at CFC from 1998 to 2005 attempted to capture the spirit and the intent of the RCAF Staff College course by providing a three-month PME experience that encouraged critical analysis, imparted higher staff skills and methods as well as fostered an understanding of air power and how to integrate it into joint plans. Besides analysing Canadian and allied air doctrine, it also gave students the opportunity to apply or modify that doctrine in the planning of specific air campaigns. In addition, the Air Term gave students the opportunity to work as a team on a major research project of relevance to CAF and a chance to explore the unique aspects of air force leadership and command.

Leveraging past experience with the CSC Air Term and using current best practices in professional and university education would allow the RCAF to implement, in the shortest possible time, new senior officer PME that meets the requirements as stated by the Comd RCAF. For example, the CSC Air Term could be used as a model for general structure, topic areas and a menu of activities. It could also be used for some content; however, a great deal of it would need to be updated. Some

of this work has already been done in the preparation for "War Studies 599: A Canadian Way of Air Warfare" graduate course, which RMCC plans to offer in the fall of 2017. Furthermore, past experience suggests that the active participation of SMEs at all stages of PME design and delivery is essential to achieving the desired higher learning levels inherent in "professional airpower mastery" and "expert comprehension of airpower and the ability to apply that understanding effectively wherever and whenever needed."[40] Otherwise, "pooled ignorance" will prevail.[41]

The Air Term was eliminated in CFC's 2006–2007 academic year. Its demise, and the demise of similar land and naval terms at CFC, left CAF with a gap in senior officer PME in component warfare at the operational level, an essential part of campaign planning doctrine. Its demise also resulted in the air force's institutional and intellectual development being limited to the tactical level. In order to restore some operational-level component expertise to the air force, new RCAF senior officer PME is required. However, this PME should not be limited to campaign design using the OPP. Following the educational philosophy of the RCAF Staff College, such PME could also help to create a well-rounded senior air force officer who possesses advanced competencies in critical analysis and higher staff skills as well as the understanding of the unique aspects of leadership and command in an air force context and the ability to create, deliver and oversee other RCAF PME programmes.

If the RCAF PME reform is to succeed, it is important to remember the saying, "What gets rewarded gets done." This maxim explains why most CAF organizational change has stalled at either the project initiation stage or the planning stage, as these are the stages that have traditionally been rewarded in annual evaluations or in other ways.[42] To optimize the chances for project success, rewards must be provided sequentially for those involved in all phases of change as the project progresses through them. Therefore, at each stage of RCAF PME reform, from curriculum planning to course development to implementation to getting students to attend new courses once they are available, rewards must be provided to those involved or the project will stall at the stage that is being rewarded.

Finally, the history of CAF organizational change has shown that speed is essential if desired change is to be successful. Windows for change can open and close quickly, and changes in senior leaders (both civilian and military), funding fluctuations, unforeseen taskings or a crisis can disrupt a change initiative. Too often CAF change has failed because the design and implementation processes take too long. However, any organizational change can also fail if it is poorly planned. The trick is to find a balance between speed of change and good planning. The suggestions made here are intended to assist the RCAF PME planning process by providing models for PME that can help to produce, within the current window of opportunity, a viable response to the challenge to reform RCAF PME articulated by the Comd RCAF.

Allan English served as an air navigator in the RCAF and CAF for 25 years in various operational and instructional positions. His book, *Command and Control of Canadian Aerospace Forces: Conceptual Foundations*, was published by the Canadian Forces Aerospace Warfare Centre in 2008, and he continues to research and publish in that area. He taught a graduate course in air warfare for the War Studies programme at the RMCC and taught courses related to air warfare, theories of war, command and leadership at the graduate level to senior and general officers at CFC in Toronto from 1998 to 2014. He was co-chair of the Department of Aerospace Studies there from 2001 to 2005. Dr. English currently teaches Canadian military history in the Queen's University Department of History. In November 2015, he was given the Queen's University Award for Excellence in Graduate Supervision in the Social Sciences and Humanities.

ABBREVIATIONS

CAF	Canadian Armed Forces
CFC	Canadian Forces College
Comd	commander
CSC	Command and Staff Course
FS	Field Study
FSE	Field Study Exercises
JCSP	Joint Command and Staff Programme
LGen	lieutenant-general
MND	Minister of National Defence
OPP	operational planning process
PME	professional military education
RCAF	Royal Canadian Air Force
RCAFJ	*Royal Canadian Air Force Journal*
RMCC	Royal Military College of Canada
SME	subject matter expert
US	United States

NOTES

1. M. J. Hood, foreword to Brad Gladman et al., "Professional Airpower Mastery and the Royal Canadian Air Force: Rethinking Airpower Education and Professional Development," *Royal Canadian Air Force Journal* 5, no. 1 (Winter 2016), 9, accessed April 6, 2017, http://www.rcaf-arc.forces.gc.ca/en/cf-aerospace-warfare-centre/elibrary/journal/2016-vol5-iss1-04-professional-airpower-mastery-and-the-royal-canadian-air-force.page.

2. Hood, foreword to Gladman et al., "Professional Airpower Mastery," 19.

3. This article is partially based on my experience filling these positions at CFC: Academic Advisor to the Commandant CFC (1998–2000); Academic Advisor, Advanced Military Studies Course (1998–2004); Academic Advisor to Air Component Programme (1998–2001); Co-chair, Department of Aerospace Studies (2001–2005); Senior Academic, Joint Reserve Command and Staff Course and Joint Command and Staff Programme (Distance Learning) [JCSP (DL)] (2003–2009); and instructor, JCSP (DL) [2009–2014].

4. Gladman et al., "Professional Airpower Mastery," 13.

5. Gladman et al., "Professional Airpower Mastery," 13.

6. Gladman et al., "Professional Airpower Mastery," 14.

7. Some works that address aspects of the new unified force curriculum are Randall Wakelam, "Officer Professional Education in the Canadian Forces and the Rowley Report, 1969," *Historical Studies in Education* (Fall 2004), accessed April 6, 2017, http://historicalstudiesineducation.ca/index.php/edu_hse-rhe/article/view/334/393; Randall Wakelam, "The History of Officer Professional Development," in *The Defence Learning, Education & Training Handbook*, ed. Dalton Cote (Kingston, ON: CDA Press, 2012); and David Bercuson, *Significant Incident: Canada's Army, the Airborne, and the Murder in Somalia* (Toronto: McClelland and Stewart, 1996).

8. David J. Bercuson cited in Ronald G. Haycock, "The Labours of Athena and the Muses: Historical and Contemporary Aspects of Canadian Military Education," *Canadian Military Journal* 2, no. 2 (Summer 2001): 8.

9. James H. Toner, "Mistakes in Teaching Ethics," *Airpower Journal* (Summer 1998), accessed April 6, 2017, http://www.airuniversity.af.mil/Portals/10/ASPJ/journals/Volume-12_Issue-1-4/1998_Vol12_No2.pdf.

10. Colonel Howie Marsh cited in Haycock, "Labours of Athena," 21, note 63.

11. Canadian Forces College Board of Visitors, "Fourth Report to the Commandant, Meeting of the BoV, Toronto, 15–16 November 2004," 10 December 2004; and Canadian Forces College Board of Visitors, "Fifth Report to the Commandant, Meeting of the Board, 25–26 April 2005," 3 May 2005.

12. Cited in Benjamin Miller, "Campus Clubs Offer a Profound Learning Experience Outside the Classroom," *University Affairs* (October 2016), accessed April 6, 2017, http://www.universityaffairs.ca/features/feature-article/campus-clubs-offer-profound-subtle-learning-experience/.

13. Hood, foreword to Gladman et al., "Professional Airpower Mastery," 9.

14. More information on this topic, including references to the scholarly literature that support the use of active versus passive learning techniques and other best practices in professional and university education, is available at "Teaching and Assessment Strategies," Queen's University, Centre for Teaching and Learning, accessed April 6, 2017; and "Focus on Active Learning: Active Learning Strategies" (Kingston, ON: Queen's University, Centre for Teaching and Learning, 2013–2014), accessed April 6, 2017, http://www.queensu.ca/ctl/sites/webpublish.queensu.ca.ctlwww/files/files/Active%20Learning%20Strategies_Focus.pdf.

15. Randall Wakelam, "Senior Professional Military Education for the Twenty-First Century," *Canadian Defence Quarterly* (Autumn 1997): 14–18; and Randall Wakelam, "Educating While Transforming: Defining Essential Professional Learning in a Complex Security Environment," *Canadian Military Journal* 8, no. 2 (Summer 2007), accessed April 6, 2017, http://www.journal.forces.gc.ca/vo8/no2/wakelam-eng.asp.

16. Wakelam, "Senior Professional Military Education"; Randall Wakelam, "Le collège d'état-major de l'ARC, 1943-1965 : formation d'état-major et éducation libérale," in *L'éducation et les militaires canadiens*, eds. Yves Tremblay et al. (Montréal: Athéna Éditions, 2004), 165–75; Randall Wakelam, "Dealing with Complexity and Ambiguity: Learning to Solve Problems Which Defy Solution," Strathrobyn Paper, Canadian Forces College, no. 4 (2010), 3–4, accessed April 6, 2017, http://www.cfc.forces.gc.ca/237/420-eng.html; CFC, *Command and Staff Course Programme 29, (2002–2003) Syllabus* (Toronto, ON: CFC, June 2002), 5-1/2 to 5-A-7/7; and quotation from Gladman et al., "Professional Airpower Mastery," 13.

17. Haycock, "Labours of Athena," 12.

18. Gladman et al., "Professional Airpower Mastery," 15.

19. Gladman et al., "Professional Airpower Mastery," 15.

20. Allan English, "Sex and the Soldier: The Effect of Competing Ethical Value Systems on the Mental Health and Well Being of Canadian Military Personnel and Veterans," in *Military Operations and the Mind: War Ethics and Soldiers' Well-being*, eds., Stéphanie A. H. Bélanger and Daniel Lagacé-Roy (Montreal & Kingston: McGill-Queen's University Press, 2016), 191–208; and Allan English, "Corruption in the Canadian Military? Destroying Trust in the Chain of Command," *Canadian Foreign Policy Journal* 23, no. 1 (15 Dec 2016), accessed April 6, 2017, http://dx.doi.org/10.1080/11926422.2016.1250654.

21. Allan English, "Outside Canadian Forces Transformation Looking In," *Canadian Military Journal* 11, no. 2 (2011): 12–19; Howard G. Coombs, "In the Wake of a Paradigm Shift: The Canadian Forces College and the Operational Level of War (1987–1995)," *Canadian Military Journal* 10, no. 2 (2010): 19–27; and Allan English, "The Operational Art," in *The Operational Art - Canadian Perspectives: Context and Concepts*, eds. Allan English et al. (Kingston, ON: Canadian Defence Academy Press, 2005), 18–25, 27–33. Between 2002 and 2008, the amount of time allocated to the study of aerospace topics was reduced by 85 per cent, while the time allocated to joint and combined warfare had increased by 56 per cent from 550 to 856 hours. CFC, *Joint Command and Staff Course Programme 35, (2008–2009) Syllabus* (Toronto, ON: CFC, n.d. circa 2008), 4-1/2; and CFC, *Command and Staff Course Programme 29, (2002–2003) Syllabus*, 8-1/3. I have used the 2008–2009 *Syllabus*, instead of more recent ones for comparison, because it is the last one with a detailed breakdown of course activities.

22. In this time frame, the curriculum time allocated to joint and combined planning (CSC 29) or joint operational planning (JCSP 35) had increased from 146.5 hours to 300 hours, an increase of over 100 per cent. This calculation is based on removing the hours allocated to "Field Study Exercises (FSE)" (CSC 29) or "Field Study (FS)" (JCSP 35) tours (CSC 29 included a trip to Europe which had been deleted by JCSP 35), which were seen by staff and students as breaks from the usual coursework at CFC. If FSEs/FSs are included, the increase in hours is from 172.5 to 352 or 60 per cent. CFC, *Command and Staff Course Programme 29, (2002–2003) Syllabus*, 8-A-2/12 to 8-A-4/12; and CFC, *Joint Command and Staff Course Programme 35, (2008–2009) Syllabus*, 4-A-4/17 to 4-A-9/17. Following CSC 32 in 2006, the CSC was renamed JCSP starting with JCSP 33 (2006–2007).

23. Alan Okros, "Civil-Military Relations: The Broader Context," in *The Defence Team: Military and Civilian Partnership in the Canadian Armed Forces and the Department of National Defence*, eds. Irina Goldenberg et al. (Kingston, ON: Canadian Defence Academy Press, 2015), 58–59.

24. Christian Rousseau, "Command in a Complex Battlespace," in eds. English et al., *The Operational Art*, 55–84; and English, "Corruption in the Canadian Military?"

25. CFC, *Command and Staff Course Programme 27, (2000–2001) Syllabus* (Toronto: CFC, n.d. circa 2000), i.

26. CFC, *Command and Staff Course Programme 29, (2002–2003) Syllabus*, i, 3-A-6/10 to 3-A-7/10 and 3-A-9/10; and quotation from CFC, *Syllabus Canadian Forces College Joint Command and Staff Programme Residential and Joint Command and Staff Programme Distance Learning 2013–14* [JCSP 40] (Toronto: CFC, n.d. circa 2013), i, 1-12/21.

27. Department of National Defence, *Leadership in the Canadian Forces: Conceptual Foundations* (Kingston, ON: Canadian Defence Academy, 2005), 97–118; and Allan English, "Cultural Dissonance: Ethical Considerations from Afghanistan," *Canadian Foreign Policy Journal* 22, no. 2 (Summer 2016): 1-10.

28. Randall Wakelam, "Air Power Writ Canadian," *Royal Canadian Air Force Journal* 4, no. 3 (Summer 2015), 132, accessed April 6, 2017, http://www.rcaf-arc.forces.gc.ca/en/cf-aerospace-warfare-centre/elibrary/journal/2015-vol4-iss3-13-air-power-writ-canadian.page.

29. Department of National Defence, *Leadership in the Canadian Forces*, 97–118; and English, "Corruption in the Canadian Military?"

30. Gladman et al., "Professional Airpower Mastery," 10.

31. Allan English and John Westrop, *Canadian Air Force Leadership and Command: The Human Dimension of Expeditionary Air Force Operations* (Trenton, ON: Canadian Forces Aerospace Warfare Centre, 2007), 90–91.

32. Gladman et al., "Professional Airpower Mastery," 19.

33. Gladman et al., "Professional Airpower Mastery," 11.

34. In this and other CFC syllabi, levels 5 and 6 are "synthesis" and "evaluation" respectively. CFC, *Command and Staff Course Programme 29, (2002–2003) Syllabus*, 1-C-1/9 to 1-C-9/9 and 1-C1-1/1. See also Klodiana Kolomitro and Katrina Gee, "Developing Effective Learning Outcomes: A Practical Guide" (Kingston, ON: Queen's University Centre for Teaching & Learning (May 2015), 6 and 7, accessed April 6, 2017, http://www.queensu.ca/ctl/sites/webpublish.queensu.ca.ctlwww/files/files/What%20we%20do/Learning%20Outcomes-Course-Curriculum%20and%20Review/Developing_Effective_Learning_Outcomes.pdf.

35. *Silver Dart Canadian Aerospace Studies*, ed. Allan D. English, vol. 2, *Air Campaigns in the New World Order* (Winnipeg: Centre for Defence and Security Studies, 2005).

36. Harry Kowal et al., "Air Force Operational Commanders of the Future: The Human Dimension" in *Air Force Command and Control*, eds. Douglas L. Erlandson and Allan English (Toronto: Canadian Forces College, 2002), 23–36; and Anne Loesch et al., "The Development of Air Force Operational Commanders," in eds. Erlandson and English, *Air Force Command and Control*, 37–51. For more on this topic see English and Westrop, *Canadian Air Force Leadership and Command*, 89–155; and Allan English, "The Masks of Command: Leadership Differences in the Canadian Army, Navy and Air Force," in *The Operational Art Canadian Perspectives: Leadership and Command*, ed. Allan English (Kingston, ON: Canadian Defence Academy Press, 2006), 1–30.

37. For Air Symposium curriculum details see CFC, Aerospace Studies Department, "The Air Term: Command and Staff Course 29," Powerpoint presentation in possession of author (2003); and CFC, *Command and Staff Course Programme 30, (2003–2004) Syllabus* (Toronto ON: CFC, June 2003), 5-A-4/7.

38. CFC, "Record of Decisions Taken at a Briefing to BGen Gosden, Commandant CFC, 11 Dec 98," 4 Jan 1999; CFC, "Air Component Programme, Aerospace Power Series, Symposium, Air Symposium 2000, C/MS/ACP/A/AS/APS/SY-1," extract from curriculum package CSC 26, n.d. circa 2000; and Allan English, "Rationale for the Air Symposium" briefing note, 10 Aug 2002. Documents in possession of author.

39. Gladman et al., "Professional Airpower Mastery," 13.

40. Hood, foreword to Gladman et al., "Professional Airpower Mastery," 9.

41. Toner, "Mistakes in Teaching Ethics."

42. "Sexual Harassment and Sexual Assault in the Canadian Armed Forces: Systemic Obstacles to Comprehensive Culture Change" (paper, Inter-University Seminar Canada Conference, Ottawa, ON, October 21–23, 2016). Available from the author on request.

BOOK REVIEWS

A HISTORY OF THE MEDITERRANEAN AIR WAR, 1940–1945, VOLUME THREE: TUNISIA AND THE END IN AFRICA, NOVEMBER 1942 – MAY 1943

By Christopher Shores and Giovanni Massimello with Russell Guest, Frank Olynyk, and Winfried Bock

London, UK: Grub Street, 2016
680 pages
ISBN 978-1-910690-00-0

Review by **Major Chris Buckham, CD, MA**

With this volume, the authors have completed the third in the *Mediterranean Air War* series and have continued to trace the details of the air war in the desert and its environs during World War II. Covering the period from November 1942 until May 1943, this installment focuses upon the arrival of the United States and the gradual but inexorable decline in the fortunes of the Axis powers, as they become squeezed into a tightening ring centred upon Tunis. As with the other volumes, this one is replete with a level of detail that will appeal to the researcher and has a readability that will draw in the casual historian. It is interesting to note the increasing complexity of the war in Africa, as new fronts are opened and new actors arrive on the stage: specifically the United States Army Air Force and the United States Navy. This level of complexity is reinforced when one considers the length of the book compared to the short period of time that it covers (six months).

The volume commences with an operational overview of the situation facing the combatants as 1942 comes to a close. Included in this narrative is the order of battle for the Allied and Axis air forces at this time. The authors also provide a solid baseline for the reader with an analysis of the Allied air plans for the operations in the eastern and western regions. The intent of the first portion of the book is to provide the reader with a big picture of the region, its challenges, the participants and the operational environment within which they operated. One of the strengths of the narrative is its ability to convey the detail and complexity of the environment while concurrently providing a real-life perspective that both educates and entertains. One of the central tenets of the Allied plan was to catch the Axis forces in a pincer movement that would cut them off from a potential avenue of retreat through Tunisia. It is a testament to the professionalism and operational acumen of the Axis air forces that they were able to provide continuing support to the ground forces despite the lengthening odds against them.

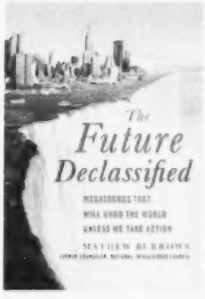
The main body of the book covers the day-by-day activities throughout the region. This follows a standard format whereby an overall explanation of the significant events is followed by a "list" of the losses and victories experienced by the various nations. The detail in this portion is

phenomenal and reflects the degree of analysis and research that has gone into the development of this volume. It is this type of detail that makes this work ideal for the researcher; although, for the more casual reader, it can become a bit overwhelming. Nevertheless, the methodology conveys the intense nature of the combat environment even on days when operations were considered to be quiet. Where possible, the authors have included photographs of the individuals being discussed, adding a degree of personality to the accounts.

The authors close with a series of narratives by pilots who participated in this theatre during the period covered by this volume. These narratives convey a very personal touch and outlook, add significant depth to the descriptions provided earlier in the work and round out the volume very nicely.

Grub Street has once again published a book of the highest quality. A relatively boutique publishing house, they have consistently impressed with the standards of their products both in terms of presentation and value. The knowledge and detail provided in volume three of this series is truly amazing. This book is a must have for those wishing to fully appreciate not only the odds that faced the Axis powers in the closing months of the North African Campaign but also the dramatic changes that enabled the Allies to both gain and expand their dominance of the African airspace; it is a strongly recommended purchase.

Major Chris Buckham is an air logistics officer in the Royal Canadian Air Force who reviews books in his spare time. He maintains a professional reading blog at www.themilitaryreviewer.blogspot.com.



THE FUTURE, DECLASSIFIED: MEGATRENDS THAT WILL UNDO THE WORLD UNLESS WE TAKE ACTION

By Mathew Burrows

New York: Palgrave MacMillan, 2014
281 pages
ISBN 978-1-137-27955-2

Review by **Lieutenant-Colonel Paul Fleury, CD**

Mathew Burrows spent 28 years with the Central Intelligence Agency as an intelligence analyst. During the last 10 years, he was a member of the United States (US) National Intelligence Council and was responsible for the *Global Trends Report*. Written every four years to coincide with the presidential election cycle, it provides a future-trends analysis out 15 to 20 years. Used by the White House, the State and Defence departments as well as Homeland Security, this report employs the most advanced research data in the US government's arsenal to predict the future. Burrows wrote this (declassified) version of the *Global Trends Report* after his retirement in 2013.

Individual empowerment, climate change, mid-income countries, declining birth rates, biotechnology, urbanization, shale oil, protectionism, shifting economic power—these are probably all trends that we have heard of. In *The Future, Declassified*, Burrows expands on the most recent *Global Trends Report* to detail some of the major shifts that will lead us to 2030 and ties these together in a logical way to ultimately predict possible outcomes for the world. Burrows builds

his book by first grouping trends into four *megatrends* and then elaborates on four possible *game changers* based upon these (mega) trends. Next, Burrows takes us into four alternative future worlds. For current or former military strategists, the latter chapters read like many of the planning exercises we do, think operations planning process (OPP). However, the short-term nature of government planning is highlighted.

Burrows describes the future as a multipolar world, a world which is influenced by many strong countries interacting together to ensure growth and prosperity. He believes this international prosperity would be the best bet for the increase of domestic jobs and the continued growth of our middle class. In a future that has the potential to be very bleak or very bright, Burrows says it is time for the US to realize that it cannot solve all of the world's problems on its own. The book was obviously written prior to the latest election, but the new President of the United States, Donald Trump, appears, at least initially, to be diverging from this mantra with his make-America-great-again philosophy. The book ends with Burrow's view on the question: Are we prepared for the future?

The Future, Declassified is fairly well written. Unfortunately, most of the trends Burrows mentions are not surprising given the current world affairs, the rise of China, economic decline, technological advances and global climate change, to name a few. Although the topic in itself is complex because of the multidimensional connections among the trends, it remains a pleasant and compelling read. Throughout the book, Burrows shows great analytical skills in tying the obvious with the less obvious to support his views. The outlook, itself, has often been characterized by the press and some reviewers as grim; however, despite this, it is not cause for celebration among the doomsayers. His message is not all doom and gloom, especially if "we" act now. Although aimed predominantly at the US, his "we" could be read as "humanity."

Why should you read *The Future, Declassified*? First of all, Burrows has a story to tell that is of interest to anybody who wants to know what is happening in the world and what the future may hold. Furthermore, it is of particular interest to those who play a role in international security, be it civil government or military, as it helps to understand trends and subsequent geopolitical shifts that will shape our future. In the end, Burrows argues that the world is currently undergoing the greatest developments in history, and we had better be prepared for an uncertain future. "We live in an era of profound change. The status quo is not an option."[1]

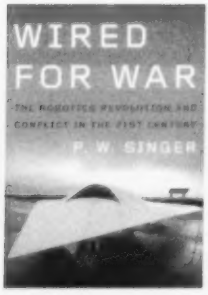
Lieutenant-Colonel Paul Fleury is an aerospace controller with an extensive background in air traffic control. He has significant experience with the North American Aerospace Defence Command and United States Northern Command and has deployed to Afghanistan as the Chief of Air Space Management. A graduate of the Royal Military College of Canada, he is currently employed as the Canadian Armed Forces Royal Canadian Air Force Liaison Officer to the Royal Australian Air Force Air Power Development Centre in Canberra, Australia.

ABBREVIATION

US	United States

NOTE

1. Mathew Burrows, *The Future, Declassified: Megatrends that Will Undo the World Unless We Take Action* (New York: Palgrave MacMillan, 2014), 13.



WIRED FOR WAR: THE ROBOTICS REVOLUTION AND CONFLICT IN THE 21ST CENTURY

By P. W. Singer

COMD RCAF'S READING LIST

New York: The Penguin Press, 2009
438 pages
ISBN 978-159420-198-1

Review by **Lieutenant-Colonel Doug Moulton, CD, MBA**

As members of the profession of arms, it behoves us to continually seek to keep current on areas of military interest. With my son just returning to university to complete his master of computer science with a focus on artificial intelligence (AI), I started to think about its implications for military operations. P. W. Singer's *Wired for War: The Robotics Revolution and Conflict in the 21st Century* provides a glimpse of what might be in store for our profession. If you often wonder where robotics might take the profession of arms, I would highly recommend this book, as it provides a number of interesting perspectives on robotics and their military applications, not to mention being an enjoyable read.

The book is divided into two main parts, the first of which focuses on the history of robotics and where we are today. As the chapter "Smart Bombs, Norma Jeanne and Defecating Ducks" illustrates, there have been a number of seminal events that have brought us to this point in time. In discussing this history, Singer makes a number of observations that he then expands upon to get the reader thinking about the wave of change that is occurring. The chapter "To Infinity and Beyond: The Power of Exponential Change" highlights the current rate of computer and robotic development and what it might mean for us as a society. If nothing else, it is the concept of a singularity occurring that should have us all thinking. If you are not sure what this refers to, it is worth the read just to find out. It certainly caused me to pause and reflect on how much autonomy we design into our future systems.

The second part of the book focuses on what these technological advances mean to us as warfighters. More importantly, it describes how robotics might defeat us in war. The stories you have heard in reference to Chinese cyber-warfare efforts are no different than their robotic efforts. In fact, they should by now have attained an advantage over North American robotics. This section continues by discussing how we might integrate on the battlefield with our robotic soldiers. It describes how we might go about conducting operations with our machines and what the concepts of human-in-the-loop and human-on-the-loop might mean for us. Any warfighter would do well to consider these ideas, as I expect you have heard very little of them.

All in all, there is a great deal of thought-provoking material here that should not go unread. In total, there are only two minor drawbacks to the book. The first is the fact that this book was published in 2009, and the detailed history of robotics stops just prior to that. Not surprising, but considering the speed of advance of computer and robotic technologies, even a non-techie will notice the gap between then and now. The second is the imprecise provision of endnotes. Although there are notes, because there is no direct linkage from the page to a particular endnote, one has to scan all of the endnotes associated with that page to see if there is any amplifying information or reference material identified. I can only assume that this was done to make the book read more like a novel, while still allowing readers who want to delve deeper into the topic to comb the endnotes

for useful resources. Despite these minor drawbacks, Singer has provided a very enjoyable read that will have all military professionals thinking about what this means to us and what we need to do to be prepared. Start reading and start thinking!

Lieutenant-Colonel Moulton, a Sea King pilot, is currently the Information Section Head for Air Warfare Education, Canadian Forces Aerospace Warfare Centre.